

MAYANG: THE TRADITIONAL FISHING VESSEL OF JAVA.

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ABSTRACT

A survey is provided of the various regional types of the traditional Javanese fishing vessel, generally called the *mayang*. Ten distinct types are described in detail, these are the *kolek*, the *compreng*, the *seroto*, the *sopek*, the *jegongan*, the Jepara *sopek*, the *konteng*, the *ijon ijon*, the *eder* and the *jangraja*. Some types show influence from the boat building traditions of peninsular Malaysia and other areas. The *mayang* building tradition is regarded as a distinct element within the overall boat building tradition of mainland Southeast Asia and Western Indonesia and separate from the boat building traditions of Eastern Indonesia.

KEYWORDS: Javanese fishing vessel, boat building, *mayang*, Southeast Asia, Indonesia, maritime archaeology.

INTRODUCTION

Colourful and exotic-looking traditional fishing craft can be found crowded together in the harbours and creeks, and on sheltered beaches, all along the densely populated north coast of Java. The details of the construction and also the colourful paintwork of these vessels vary regionally, but they have been recognised as constituting a distinct family of traditional craft within the overall context of Indonesian and Southeast Asian maritime traditions. The ostensible characteristics of the Javanese vessels belonging to that family are: a broad, shallow draughted hull with no fixed deck, typically about 10 to 12 metres in length; a large projecting prow, and a similar stern finial, with recurved profiles (Fig. 1); and the use of bulkheads rather than frames to strengthen the hull. This family of vessels has been classified as *mayang*. Properly, the term *mayang* only applies to those vessels equipped with a *payang* (seine net) but the term has been usefully extended to include all similar vessels in the Javanese tradition. Van Kampen (1909) made use of the term in his survey of the Javanese fishing industry and his usage has been followed by Horridge (1981), Hawkins (1982) and Burningham (1989). Horridge (1981: 47) characterised the "mayang type" as "flat-bot-

tomed with a large (sometimes very large) flat stem and a tilted rectangular sail which is hauled up a single tall mast". Burningham (1989: 195) refined the definition by arguing that the distinctive construction of the *mayang* has "four broad strakes forming a section with three chines".

This traditional fishing craft of Java, the *mayang*, can be regarded as a distinct family or class of traditional watercraft, both on the level of broad cultural distinction and on the basis of structural uniqueness. Macknight (1980) argued that boat design and construction form but one of the elements of a maritime tradition or culture and that in the study of Indonesian maritime cultures, four major traditions, or groups of traditions, should be recognised within the Indonesian archipelago. These Indonesian traditions are distinct from those of the South China Sea on both historical and formal grounds. The four maritime traditions of Indonesia are: 1, Sumatra and the western and southern coasts of Malaysia; 2, Java including Madura and off-lying islands; 3, South and Southeast Sulawesi; and 4, the Moluccas and surrounding parts of Eastern Indonesia. The *mayang* is the most important extant vessel of the Javanese tradition and is significantly different from the vessels of the other traditions proposed by Macknight. Details of these differences are presented in the text. We

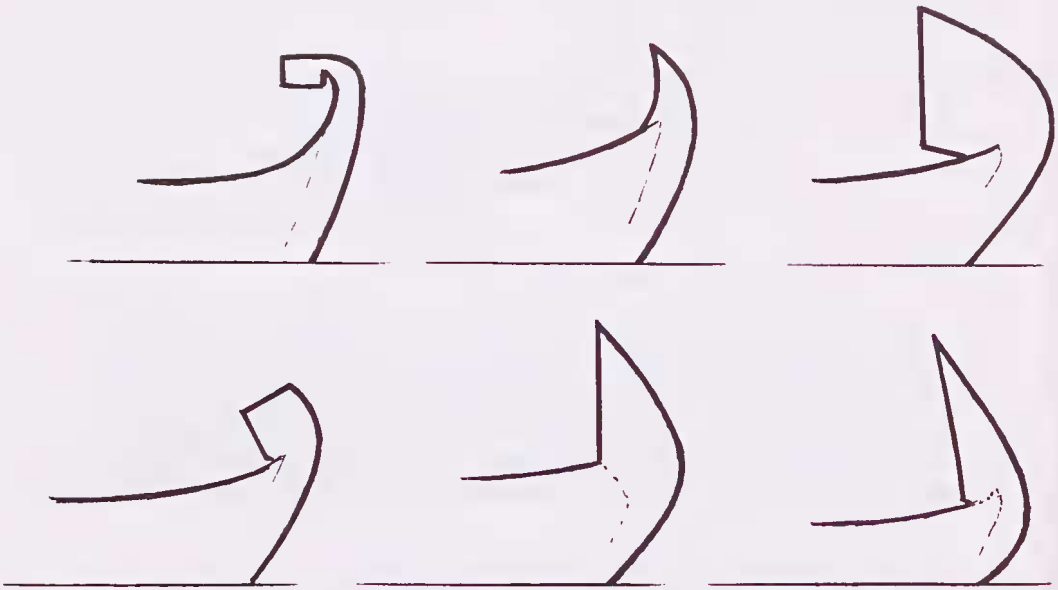


Fig. 1. Recurved prow profiles of 19th century and 20th century *perahu mayang*.

argue that the Javanese *mayang* building tradition is fundamentally different from the boat building traditions of Eastern Indonesia (those of Macknight's groups three and four) but it is more closely related to the traditions of Sumatra and especially Malaysia. The basis of this relationship is McGrail's (1985: 291-292) argument that, in the classification of traditional watercraft types, analysis of structural differences should be preferred over consideration of raw materials used, or the form or shape of the craft, because "Emphasis on *structural* differences may reveal culturally-determined principles." McGrail (1985) proposed a scheme of classification that divided shell-built boats into seven categories (and skeleton-built boats into a parallel seven categories) according to the use of three main techniques by which boatbuilders convert their raw materials into a boat. On the basis of that system, the planked boats of Eastern Indonesia (where planks are carved to shape but not bent to shape) belong to McGrail's classification C4, while the *mayang* and the vessels of Sumatra-Malaysia belong to C7 because the planks are cut and then bent into shape.

This paper provides a description of all the various types of *mayang* that can be found along the north coast of Java and defines more precisely the *mayang* as a distinct family of watercraft through a detailed description of the *mayang* building tradition. Ten distinct types of *mayang* are described:

1. the *kolek*, originally from Central Java but now found mainly in West Java, a type which exhibits *mayang* design virtually unaltered by other boat building traditions;
2. the *compreng*, from the Cirebon region of West Java, which shows some Malay influence in its construction;
3. the *sopek*, from West Java, which is a relatively plain modernised version of the *mayang*;
4. the *seroto* from the Indramayu region of West Java, which shows Malay design with only a few features of the *mayang*;
5. the *jegongan*, also from the Indramayu region, which combines the *mayang* hull form with some of the construction features of the planked-up dugout canoes of the Bajau "Sea Gypsy" people;
6. the *sopek* from the Jepara region of Central Java, here designated the "Jepara *sopek*" to distinguish it from the West Java *sopek*;
7. the *konteng*, an East Java version of the *kolek* which shows some influence from the traditions of Madura and Eastern Indonesia;
8. the *ijon ijon*, a smaller *mayang* built alongside the *konteng* in the Lamongan region of East Java;
9. the *jangraja*, built by Madurese boatbuilders in the eastern part of East Java;
10. the *eder*, built only in Madura.

Measured midsections for all the boat types are illustrated. It will be shown that the first of the chines in Burningham's (1989) proposed



Fig. 2. Map of Java showing places mentioned in the text.

three chine hull form is often absent or scarcely perceptible in the midsection, though it does appear towards the bow and stern in most cases.

The four strake construction proposed by Burningham was qualified with the observation that "frequently [*mayang* are] built with a greater number [than four]... strakes because of the difficulty in acquiring suitably wide planks. Even so, the builders... consider the vessels to have four strakes" (1989: 195). An example was given of a plank naming system which nominated only four strakes but was applied to a vessel with a greater number of strakes. In this paper plank naming systems for all the *mayang* are provided. It will be seen that some nominate five strakes, but we argue that this is a recent adaptation.

The various systems of naming the planks, which are employed by the traditional boat builders in different places along the north coast of Java, reflect the fact that in the *mayang* building tradition, the planking at the ends of the hull is always regarded as structurally distinct from the planking of the midbody.

The names which are here ascribed to the various types of *mayang*, are, in most cases, the names used by the builders of the vessels. These names are here applied consistently for the sake of classification. But such classification is, in a sense, arbitrary: most *mayang* types are known by a variety of different names in different areas, by fishermen, by builders and by people less directly involved with the fishing industry. Several local names are derived from the names for types of nets, for instance *pukat*, *bondet*, *kerakat* and *jaring*, in the same way that fishing vessels are classified as trawlers, seiners, longliners, etc. Other names, such as *jukung*, and possibly *kolek*, appear originally to have meant no more than "fishing boat".

The various types of *mayang* are described below in an order which approximately corresponds to their distribution from west to east along the north coast of Java. There is, however, considerable overlap in the distribution of the types, particularly in West Java.

Where the principal dimensions of a hull are listed, the convention of listing length overall x extreme beam x moulded depth, in that order, is followed. Length overall is the horizontal length of the entire hull including stem and sternpost but excluding any projecting spars or steering gear. Moulded depth is the vertical distance between the top of the keel and the rail: it has nothing to do with the draught, or depth of water in which the vessel will float.

All the *mayang* are normally built of the same materials. Planking and frames are normally teak (*Tectona grandis*), dowels and treenails are *kayu pung* (*Dichrostichys cinerea*) and the luting between the planks and timbers of the bulkheads is the bark of the paperbark tree (*Melaleuca* sp.) called *gelam* or *gelang* in Indonesia.

The data presented here were mainly collected by Stenross on two visits to Java in 1989 and 1990. Burningham was in Java in early 1989 and briefly in West Java in early 1991. Following a visit to Madura by Burningham in March-April 1994, the section describing a Madurese type of *mayang* called the *eder* was added. Both authors visited as many boat building sites as possible and several sites have been visited independently by both authors - inevitably resulting in the collection of some contradictory data. Where possible, experienced builders were interviewed and data was checked with other experienced craftsmen. The Javanese technical terms and plank naming terminologies listed below were confirmed in this way, but, as with the naming of

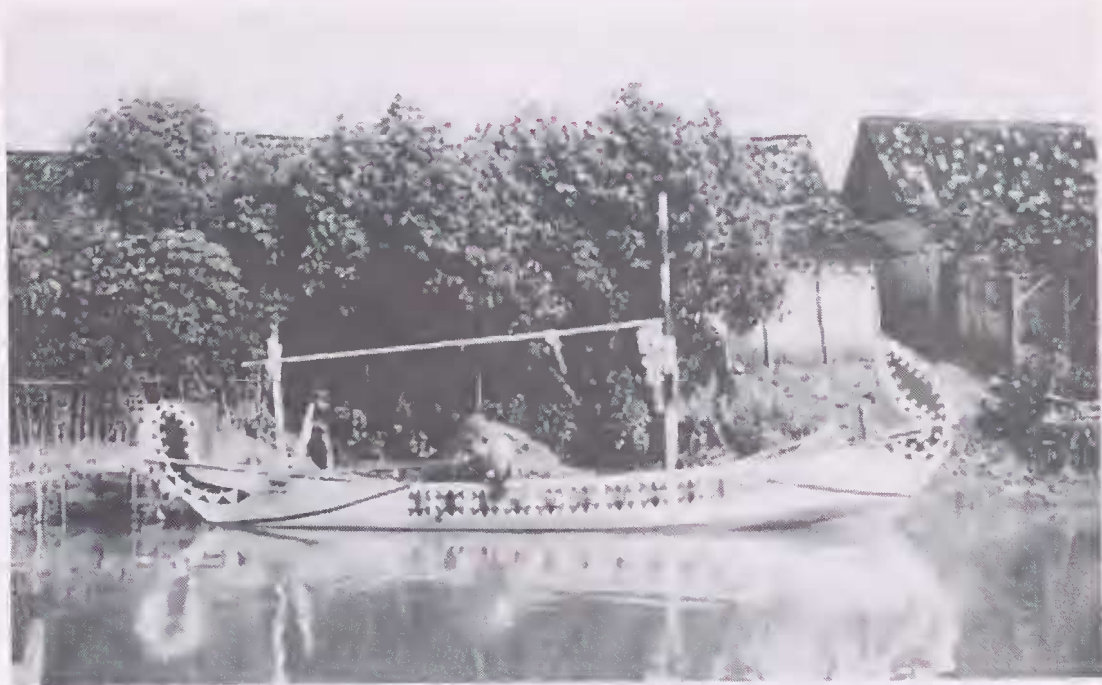


Fig. 3. *Kolek*.



Fig. 4. Bow of a *kolek*.



Fig. 5. Stern of a kolek showing the rudder held in place against the projecting *mangga mangga*.

perahu types, few terms are completely uniformly applied even within one village. Some of the boat builders in East Java acknowledged Madurese descent. In West Java, virtually every builder spoken to acknowledged being Javanese rather than Sundanese.

Data from Malaysia, particularly Terengganu, was collected by Burningham on visits to Malaysia in 1979 and 1991. Comparison with the traditional craft of Thailand and Vietnam, made here, relies almost entirely on the literature rather than first-hand experience. Particularly useful is the large catalogue of photographs in the so-called "Blue Books" prepared by the USA Defence Department (RACIC 1967).

KOLEK

Kolek are a type of *mayang* found mainly in West Java, but some are found in Central Java, and formerly they were built there. *Kolek* are the most widely distributed type; they are also the largest *mayang* and one of the most numerous. The large fleets of *kolek* that operate in the highly populous areas of West Java are all motorised and their fishing techniques have been modernised as a result of government programs

designed to increase the efficiency of the fishery. The *koleks* are likely to be replaced by more modern and utilitarian types of vessel in the near future.

The name *kolek*, and cognate names such as *golek*, *golekan*, *kole-kole*, *kora-kora*, etc., are used over a wide area of Indonesia and neighbouring states to name a range of small and larger craft. Apart from the particular type of *mayang* described in this section, there are various types of small craft in Java which are referred to as *kolek*. For instance, the *kolek Pulau Seribu* from the islands off Jakarta are small, narrow beamed craft with a very small version of the distinctive prow (*linggi*) carried by the *kolek*. Some other vessels that can be called *kolek* in Java have no *linggi* and they are usually crudely built. These vessels are not *mayang* according to the definition used in this paper because they do not have the typical *mayang* midsection and hull form.

Recognition. The *kolek*, like most *mayang* types, is most easily identified by its decorative prow structure called the *linggi*. The *linggi* of the *kolek* is a large projection of the stem above the bow (Fig. 4). There is a smaller, similarly shaped *linggi* in the stern. The profile of the aft *linggi* is somewhat flattened and is embellished

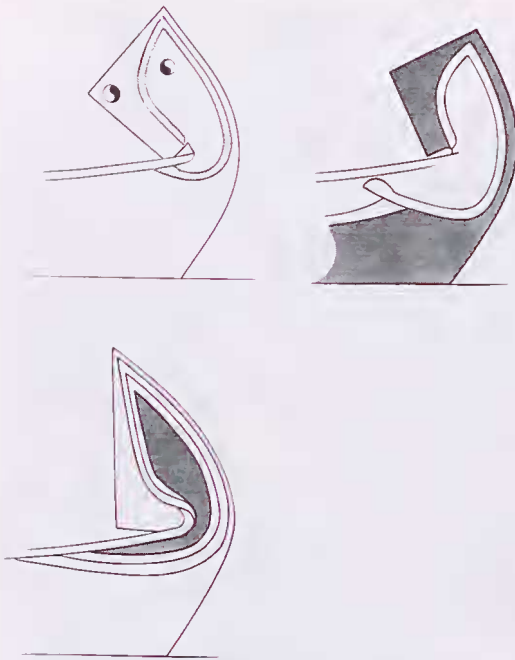


Fig. 6. Typical shapes and decorations of the *linggi* of *kolek*.

with a piece of carving, called the *amplok*, on its aft edge (Fig. 5).

There is some variation in the styling of the *linggi* of *kolek*. Some *kolek* have a smaller *linggi*

with a more trapezoidal profile. Three styles of *kolek linggi* with their typical decorative paint patterns are shown in Figure 6. The trapezoidal style has almost disappeared but a few examples remain in Central Java (Fig. 7).

Size. *Kolek* are usually beamy, shallow-bodied vessels: they are of a design suitable for handling large *payang* nets. A typical example measured 12.2 m length overall (11.4 m length between the tops of the rabbets on the stem and sternpost) x 3.64 m beam x 1.03 m depth from the top of the keel to the rail. In profile, the *linggi* measured 1.70 m at its greatest width and extended 1.90 m above the top of the bow.

Some *kolek* of similar relative proportions measure 15 m length overall; these are the largest *mayang*. Very small versions, about 7 m long, were also built in the past. These were known as *jukung*, a common, general name for small, planked craft in West and Central Java.

Rig. The traditional rig, shown in Figure 8, is rarely seen now. It is a single, broad, tilted, rectangular sail with the yard and boom somewhat longer than the hull of the vessel. The mast is stepped at one third of the hull's length from the bow. It is stepped through a large thwart, against the aft side of a bulkhead with its heel set into a large floor timber. The yard is made of two or three pieces of bamboo, which are lashed together



Fig. 7. An old style *kolek* from Central Java.

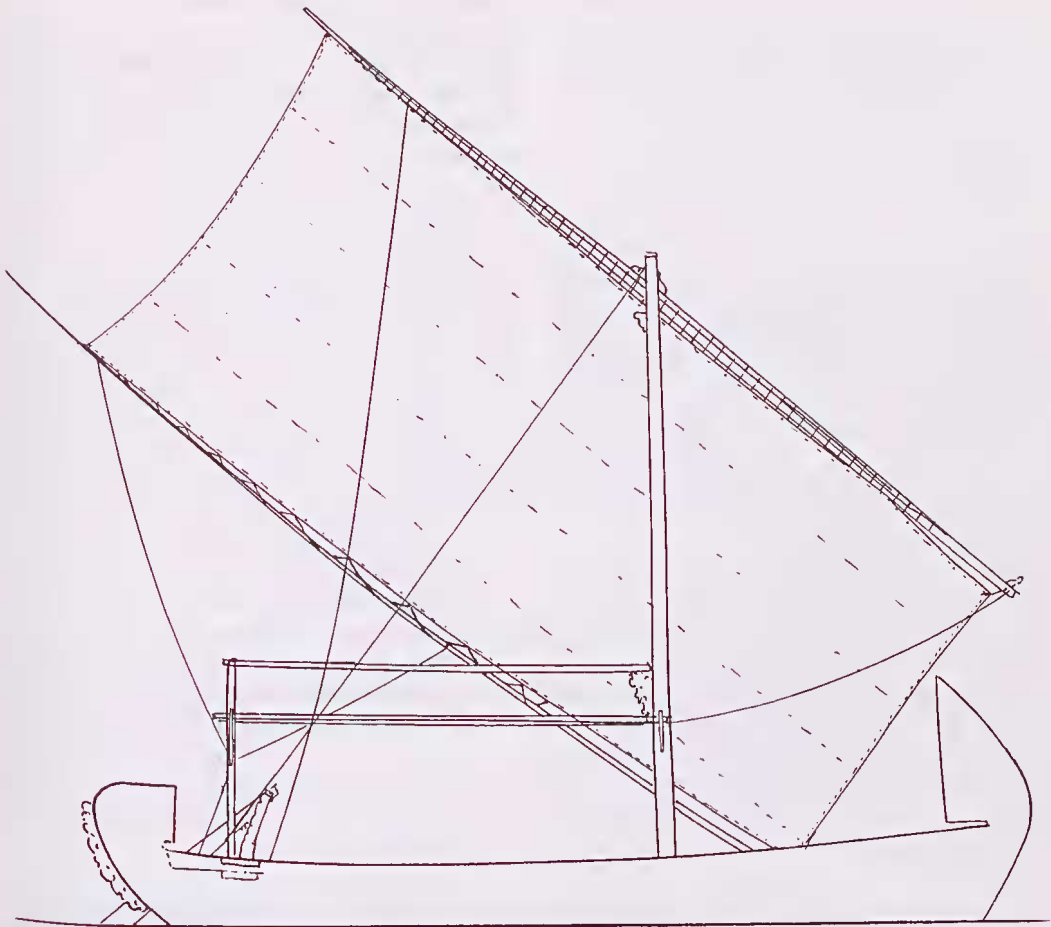


Fig. 8. The rig of a kolek.

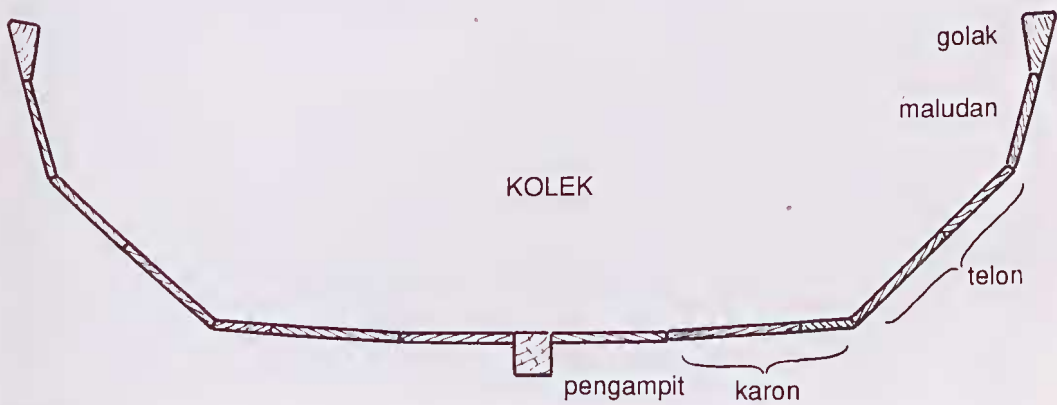
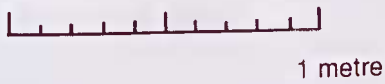


Fig. 9. The midsection of a kolek with the strake names.

with numerous frappings or seizings at about 100 mm intervals to give the required strength and stiffness. The boom is a more flexible, single bamboo. Horridge (1981: pl. L) shows an excellent photograph of a *kolek* under sail.

The smaller *kolek*-styled *jukung* carried a two masted spritsail rig similar to that shown in Figure 34.

Use. The primary use of the *kolek* is for fishing with the *payang* net. The nets are usually large (and nearly as expensive as the boat), take up much room on board and require a large crew to handle them, especially since winches are not used traditionally; a typical crew is fifteen men. The *kolek* is scaled to handle the largest size of *payang* net while still being reasonable easily propelled with oars during calms and while shooting the net. The relatively low freeboard facilitates handling of the net.

Distribution. *Kolek* are found today mainly in two places: Jakarta Bay (especially Kali Baru) and Eretan, a small town west of Indramayu, West Java. There is no traditional boat building at Kali Baru, Jakarta. Most of the *kolek* which are operated from there were built at Eretan, but some are said to have been built in Central Java, especially at Pemalang. Until recently, a few *kolek* were ordered from boat builders at Gebang, near Cirebon in West Java, although it is not the

traditional *mayang* for that area. The Cirebon builders called these *kolek* "*kedokan*", a term that probably refers to the sheer strake called the *kedok* or *gedok* by the boat builders of Cirebon, and some other areas. As shown below, the sheer strake of the *kolek* is very different from the sheer strake of the *ma-yang* normally constructed in the Cirebon area.

In both Kali Baru and Eretan, *kolek* remain the predominant traditional type and they are very numerous. However, it seems that few were built in the last five years. Although many of these beautiful vessels are carefully maintained by proud owners, *mayang* do not have a particularly long working life, due in part due to certain aspects of their construction and in part to the rigours of the wet tropical climate. It seems unlikely that the remaining *kolek* fleets will last more than another ten years unless there is a revival of *kolek* building.

Recent history. Today the *kolek* appears to be a West Java *mayang* type but that was not originally the case. Van Kampen (1909: pl.3) illustrates *kolek* and calls them "*Majangs van Tegal*"; Tegal is in Central Java. A number of boat builders, interviewed in various places, stated that the *kolek* originated from Batang, near Pekalongan, in Central Java, about 70 kilometres further east than Tegal. We do not know



Fig. 10. Twisting planks of an opposing pair over a fire.

of the construction of any large *mayang* in Central Java during recent years and doubt that any has taken place.

There is reason to believe that construction of the *kolek* style has only recently been introduced to Eretan in West Java. The traditional *mayang* of the Eretan area appears to be the *jegongan* (see below) which is a distinctly different type of *mayang*. There are several examples of similar transposition of boat building tradition on the Java coast. Van Kampen (1909:10) noted that the Rembang area in Central Java was the foremost area for Javanese boat building and that the Rembang builders built *mayang* for sale to the areas of Banten, Cirebon, Pekalongan, Semarang, Surabaya, Pasuruan, Besuki and Madura - in other words, virtually the whole north coast of Java. They built *kolek* for use in Central Java but they would build any other style on request, even the *jangraja* (see below) of East Java. Other places in Central Java where *mayang* were built for sale to distant areas were Juwana, Jepara and Batang. Today there is little or no *mayang* building anywhere in Central Java, apart from the small *sopek* (see below) built around Jepara and Juwana. In the Rembang area there appears to be no boat building. Types which were formerly built by the renowned builders of Rembang are now built in other parts of Java.

The *kolek* builders at Eretan employ a set of boat building terms which differ from those used in the neighbouring West Java boat building centres around Indramayu and Cirebon. The Eretan boat building terms seem to have come from Central Java. Some old people at Eretan say that when they were young, there were close links between Eretan and the town of Batang in Central Java. This is curious since the two places are quite a distance apart and there are a number of boat building centres and places of much greater economic importance between them.

Today there is no traditional boat building in Batang, Central Java, and it is apparently several years since any traditional boat building took place there. However, in 1990 Stenross visited a respected, retired *mayang* builder in Kelurahan Karangasem to the west of Batang. A man of over forty years experience as a boat builder, he said that Batang had been the major centre of *mayang* building. *Mayang* had been built regularly to fulfil orders from places including Pekalongan, Pemalang and Tegal in Central Java and Eretan, Kali Baru and Muara Angke in West Java. Mostly these were *kolek* but a type called *condong* were ordered by the fisherman of Muara

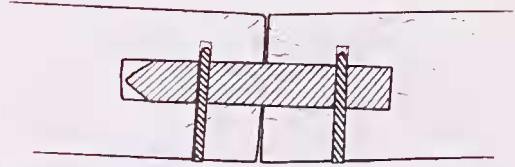


Fig. 11. Section through planking showing edge dowelling and locking pins.

Ciasem. From his description, these seem to have been the same as the *condong* or *bingkoeng* illustrated in Van Kampen (1909: fig. 7, pl. 17) rather than the *condong* illustrated in Burningham (1989: fig. 16) which was probably a kind of hybrid *condong/jegongan*. None of these *condong* exist today.

Names for the strakes used in the construction of *kolek* were obtained from this builder (his wife and his son were also familiar with all the terms) and these proved to be the same as the terms used by the *kolek* builders at Eretan. Stenross was told, at Batang, that about twenty years ago, a local man named Siong who built *kolek*, married a woman from Eretan; he moved to Eretan and introduced the building of *kolek*.

Construction. *Keel, stem and sternpost.* The keel (*lunas*) is a straight timber of more or less square cross section. The stem and sternpost (*solor*) meet the keel at a definite angle rather than curving into the keel through the forefoot and heel. Both the stem and sternpost rabbets are gently curved. The stem is more upright than the sternpost - this is a typical feature of *mayang*. The term *solor* is only applied to the stem and sternpost proper, the upper decorative part of the prow and the sternpost is the *linggi*. The *linggi* of a *kolek* is made up from a number of planks edge dowelled together and dowelled to the *solor*. The carving on the sternpost, the *amplok*, is usually part of the sternpost, not an addition.

While the *solor* are rabbetted to receive the hood ends of the planking, the *linggi* are not in any way attached to the planking. The large bow *linggi* is therefore rather poorly supported. It gets some support from having its lower edge notched into a short thwart (*polangan*) in the bow, as shown in Figure 12. *Linggi* are frequently damaged and broken off in crowded harbours.

Midsection. The *kolek* midsection has almost no deadrise and shows two distinct chines. Figure 10 is a measured midsection of a typical *kolek*; it has only 30 mm of rise from the keel to the first chine. Originally this midsection would have been formed from four strakes, as shown by the strake nomenclature in Figure 9. Today it is

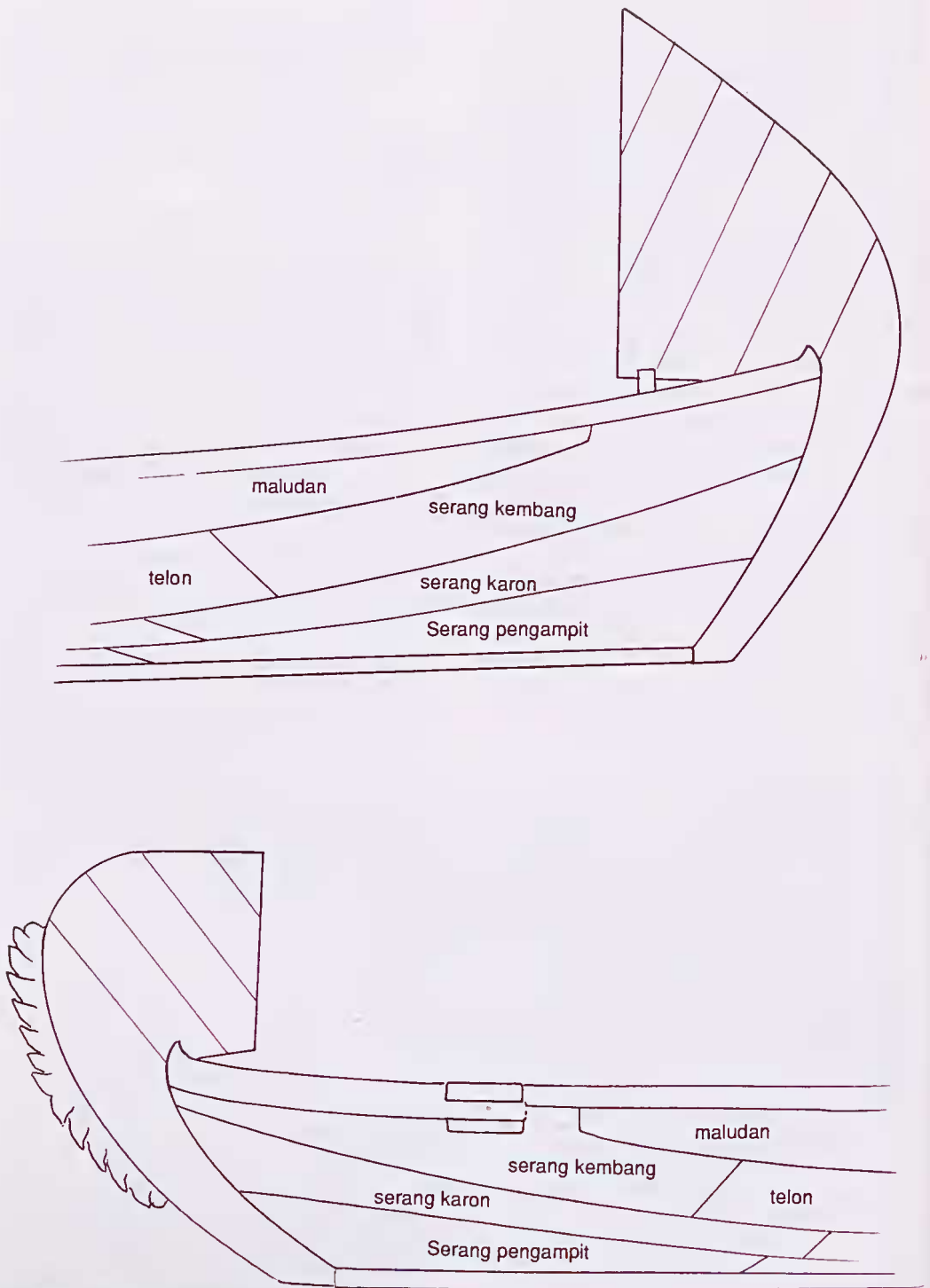


Fig. 12. The bow and stern plank patterns of a kolek with plank names.

usually necessary to use more than four strakes to form the hull of a large kolek. The use of six strakes is typical, but the four strake terminology

is retained. Builders at Eretan also use this terminology when building a more modern type of fishing boat with a similar hull form. In the tra-

ditional strake terminology the first two strakes, *pengampit* and *karon*, form the bottom of the hull (*dasar*). Frequently the *karon* is made up of two or three strakes. The *telon*, which is the bilge strake, is nowadays usually two strakes but formerly very wide planks were employed: Burningham (1989: 206) notes a plank of 720 mm width used on another type of *mayang*. The topside strake, *maludan*, is relatively narrow and is usually a single strake in modern construction. The *maludan* is capped by a heavy rail timber, the *golak*, which is usually about 200 mm deep and is finished flush with the *maludan* on the outside.

Planking. Javanese *mayang* are built with fairly long planks by comparison with many other Indonesian craft. Whereas most of the craft of Eastern Indonesia are built from fairly short baulks of dense timber which are carved to shape, the Javanese builders use sawn planks which they bend to the desired shape, using heat to make the timber pliable. The planks are usually bent in matched opposing pairs to achieve symmetry in the construction of the two sides of the hull. Figure 10 shows two planks being twisted to shape.

The garboard strake (*pengampit*) is fastened to the keel with edge dowels of about 10mm diameter at 100 mm intervals. The planks are edge dowelled to each other in the same way. The edge dowelling is locked with small locking dowels called *paku dindian* (Fig. 11).

Planks of the largest available size are used in the midbody: butts or scarfs in the planking never occur near the midsection. The midbody planks

of the lower strakes terminate with fairly long straight scarfs. In the upper planking the scarfs are shorter, really just slanting butts. In all cases the scarf or butt slopes downwards towards the nearer end of the vessel. These scarfs or butts are called *serangan*. The use of these scarfs and the term *serangan* (sometimes *sirungan* or *serongan* in other areas) is common to all types of *mayang*.

The strake names noted above apply only in the midbody: forward and aft of the *serangan* the planks of the *pengampit* strake are called *serang pengampit*, the planks of the *karon* strake are *serang karon* and the *telon* strake ends with planks called *serang kembang* (rising planks). The sheer strake (*maludan*) is tapered out with no *serangan* and no *serang* planks. As with the *linggi* and *solor* the same terms are used both in the bow and the stern; the Indonesian words *depan* (forward) and *belakang* (aft), or their Javanese equivalent, are used to differentiate where necessary. Figure 12 shows typical plank patterns for both bow and stern of a *kolek*.

Bulkheads. There are twelve bulkheads. All except those right in the bow and stern are topped by thwarts. The thwarts are fitted about 450mm below the rail. Underneath the thwarts the bulkheads are made of heavy planks laid horizontally and edge dowelled together. Above the thwarts the planking and rail are strengthened by short top pieces. These top pieces are fitted with the grain running horizontally - parallel to the grain of the timbers in the bulkhead. There is a temporary decking of loose planks laid fore and aft between the thwarts and this is the standard arrangement for all *mayang* types.

Rudder mounting system. The tall spar crutch (*sanggaan*) and the post (*sumbi*) which supports the upper end of the rudder are both stepped through a pair of thwarts (*daporan*) which are positioned one above the other. Figure 13 shows this arrangement in a side view: it can be seen that the upper thwart is heavier, measuring about 400 mm x 90 mm in section. Both thwarts project outboard, the upper one projects slightly further and often has a chock on the forward edge to brace it and fair it into the *golak* (rail). Although the *daporan* thwarts project outboard, the rudder does not rest against the aft edge of the projection as it does in many other types of traditional Indonesian craft (and also those of Malaysia and Thailand). Instead the rudder is lashed against the aft edge of a short stout stick (*mangga mangga*) which projects diagonally across the rail. The inboard end of the stick is jammed

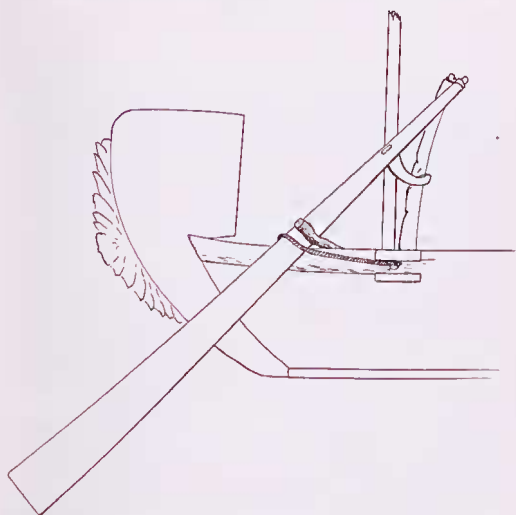


Fig. 13. A *kolek* rudder mounting system.



Fig. 14. *Compreng*.

between the two *daporan* and forward of the *sumbi*. The rudder is used on the leeward side when the vessel is under sail and must be shifted around the stern when changing tack. Under power, the

usual convention is to carry the rudder on the starboard side; the *payang* nets are usually shot from the port side of the hull.

The *golak* or rail terminates just forward of the *daporan*. It is extended aft by a much heavier timber called the *katir*. The upper *daporan* is notched flush into the *katir* and secured to it with large dowels: further aft another short thwart is let into the *katir* in the same way, but it does not project outboard. There is a similar thwart in the bow. These thwarts are important structural members, tying the two sides of the hull together at the ends.

COMPRENG

The *compreng* is a West Javanese *mayang* which is fairly similar in appearance to the *kolek* although there are many differences in construction. The *compreng* must be of considerable economic importance in West Java: it is probably the most numerous of all *mayang*.

Recognition. As with the *kolek*, it is the large bow *linggi* that is the most conspicuous feature. The profile of the bow is quite similar to that of the *kolek*, but the smaller *linggi* in the stern comes to a point rather than being flattened like that of the *kolek* (Fig. 14).

Although the bow profile is much the same as that of the *kolek*, in the detail of the construction there is considerable difference. The upper part of the rabbet on the stem rakes back inboard (Fig. 15). The topside strake, instead of tapering



Fig. 15. Bow of a newly constructed *compreng*.

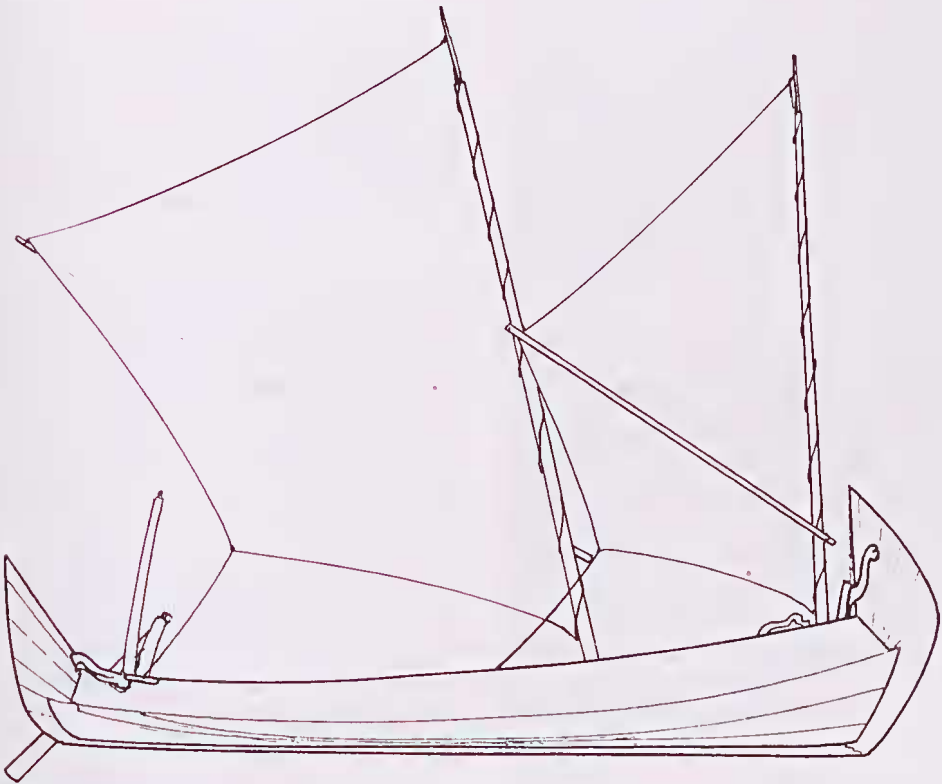
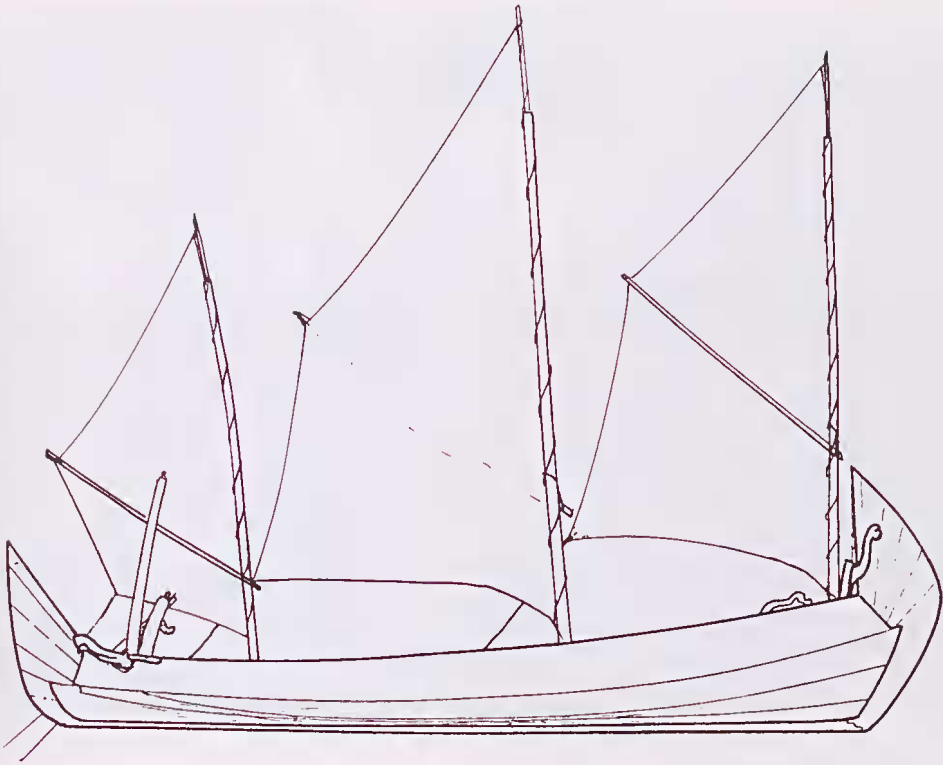


Fig. 16. Above, *compreng* rigged with short sprits; below, *compreng* rigged with longer sprits and square headed sails.



Fig. 17. *Compreng* under construction.

out under the rail as it does in the *kolek*, is carried through to end in the rabbet (i.e. rebate) which is cut in the *linggi* (prow), not in the *solor* (stem). The *linggi* of the *compreng* is faired into the topside planking and for this reason it is much thicker on its inboard face than that of the *kolek*.

Size. The *compreng* is generally a smaller boat than the *kolek*, although the largest are fully 12 m in length. A typical boat measured 9.74 m l.o.a. x 2.63 m beam x 0.8 m depth of hull. Most are of about this size.

Rig. The normal rig is a two or three masted spritsail rig in a schooner configuration. All three masts are easily unstepped and furling is achieved by unshipping the sprit, unstepping the mast and simply rolling the sail around the mast. The mizzen is only carried when going to windward in light conditions. The foremast is usually unstepped before entering confined water. The shape of the spritsails, varies from nearly triangular to nearly square (Fig. 16). Horridge (1981: pl. 24) shows a *compreng* carrying a rather scruffy example of the rig with nearly triangular sails and a relatively small mainsail. A neater version of the rig, with the mizzen mast unstepped, and carried by a *perahu jegongan*, appears below as Figure 34.

The sails are called *layar padok* (foresail), *layar agong* (mainsail), and *layar kapel* (mizzen). Each mast is stepped through a thwart with its heel in a longitudinal mast step. This longitudinal step allows the rake of the mast to be adjusted to optimise performance in varying wind strength and different points of sail.

Use. *Compreng* have been used for various fishing techniques. Today they are mainly used for inshore prawn and shrimp fishing with fine mesh nets. The boats usually sail out with the land breeze before dawn and return during the day. The majority are not large enough to handle a modern *payang* net.

Distribution. The *compreng* is very common along the north coast of West Java. From Banten to Indramayu they are usually called *tembon*. Around Cirebon, where the greatest concentration exists, they are called *compreng*.

Probably the biggest fleet can be seen at Gebang, about 10 km east of Cirebon. In the late afternoon the river at Gebang is jammed solid with *compreng*. There is a bridge over the upper part of the harbour and the boats which moor upstream of this bridge all have their forward *linggi* cut down a little to allow them to fit under the bridge. These modified boats are known as *caplo-*

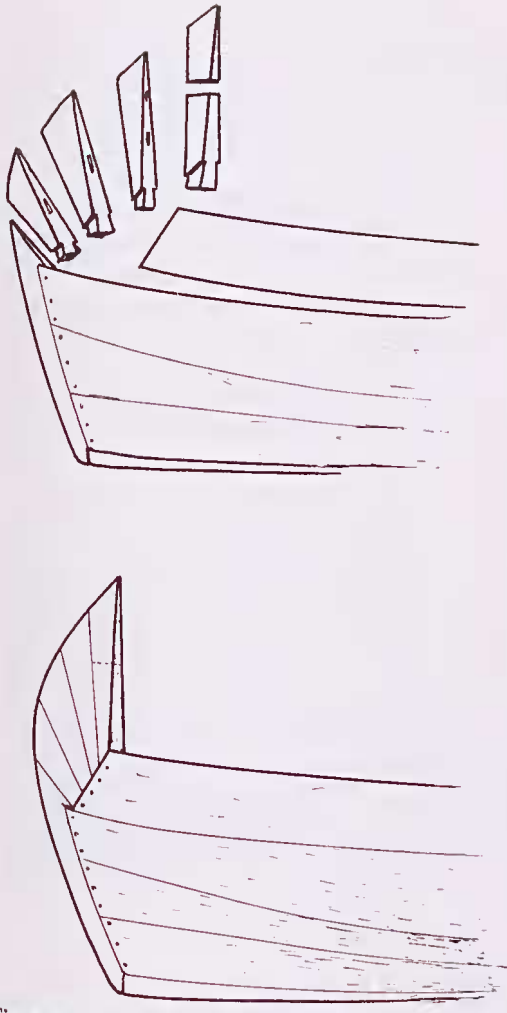


Fig. 18. The bow structure of a *compreng*.

kan. They can also be found in some other ports.

Recent history. *Compreng* seem to be a recently evolved style of *mayang*. Van Kampen (1909: 35) mentions the *tjompreng* or *djoekoeng tjompreng* of Cirebon, but an illustration (1909: pl.1) shows that this was a large, long and narrow, planked up dugout canoe. A few of these could still be seen derelict near Gebang in 1989. Van Kampen did not describe or illustrate any vessel that resembles the modern *compreng* and it seems unlikely that he would have missed them if they had existed at that time.

Today large numbers of *compreng* are built in a number of villages around Cirebon and Indramayu. At Gebang it is claimed that one third of the men of working age are employed in the building of *compreng*. Other notable *compreng* building centres are Mundu, on the out-skirts of

Cirebon, and Surakarta, a little to the east. Many boats are built to fulfil orders from fishermen of other areas.

The *compreng* is an attractive and popular design. It seems to be the product of skilful and ingenious builders who have developed a handsome and well built vessel that can be economically built with light, mill sawn planks. The planking of many *compreng* is only 20 mm thick. Their modest size and cost makes them attractive to small operators who could not afford the financial outlay required for a larger *payang* equipped vessel. However, while the *compreng* remains popular and is still being built, it is gradually losing popularity to a newer type, the *sopek*, which is of similar construction and which is described below.

Construction. Keel, stem, and sternpost. The keel, which is straight throughout its length, is usually more or less square in section. It is sometimes noticeably wider than its depth and of rather slender dimensions for a keel. The stem (*solor*) meets the keel at a distinct angle. The rabbet on the stem proper is nearly straight although (as noted above) the rabbet on the *linggi*, or *gemplo*, which takes the hood ends of the sheer strake, angles back sharply. This upper bow structure, consisting of the *gemplo* and forward plank of the sheer strake, is only fitted after the rest of the hull has been completed. Figure 17 shows *compreng* bows before the addition of the *gemplo*. At this stage of the construction the *compreng* closely resembles a completed *perahu* of a type illustrated by Van Kampen (1909: fig 8c). These vessels were known by a number of names, especially *dermayuan*, indicating origins in Indramayu, and also *jegong*. They were mainly associated with the population of Malay (Johor) origin settled in the Krawang and Indramayu areas. The *gemplo* (Fig. 18) is usually constructed of solid blocks of timber morticed together, but some are planked structures, particularly on the older boats at Karang Song near Indramayu.

The stern construction is different from that of the bow. There is no true sternpost. Instead a sternpost is built up from horizontally laycred blocks of timber morticed together. This is how the stem and sternpost of the original canoe *compreng* were built up, and the construction is still used today on the built up dugout canoes of Central Java called *jukung*. A rabbet is cut in this built up sternpost of the modern *compreng*, but a rabbet is not part of the construction of *jukung*. The sternpost rabbet of the *compreng* is curved.

The sheer strake and *gemplo* structure of the upper part of the stern is essentially the same as that in the bow, although the profile of the *gemplo* is different.

Midsection. The midsection of a typical *compreng* shows double chines and a slight rounding up to the first chine in the bilge. The measured midsection in Figure 19 shows three named strakes in the bottom of the hull and a total of five actual strakes and five named strakes. Sometimes a greater number of actual strakes is required when sufficiently wide planks are not available. The significance of this five strake system is discussed below under the heading "Plank naming systems".

Planking. As in the *kolek* and all other *mayang*, the longest planks are used in the midbody of the vessel, and the special terms given to the strakes through the midbody do not apply beyond the *serangan* scarfs towards the ends of the hull. The plank pattern and the positioning of the *serangan* is not as precise as on the *kolek*; the plank pattern can be varied somewhat according to lengths of the planks available. Figure 20 illustrates a typical plank pattern with the names of the planks. It will be seen that the sheer strake, made up of the *gedok* and two *tekol*, has very little taper towards the ends of the boat. This is unusual in *mayang* construction. There are other unusual features in the plank pattern of the *compreng*.

While the *kolek* plank pattern is more or less the same forward as it is in the stern, the plank pattern in the stern of the *compreng* is quite different from that at the bow. In the stern all the strakes except the garboard strake and the sheer strake (and sometimes the second strake) are tapered out before reaching the sternpost.

The arrangement of the *serangan* can be seen in Figure 20. The scarfs all slope downwards towards the nearer end of the vessel. Forward, the scarfs are staggered in much the same way as they are on the *kolek*, but in the stern the scarfs in all the strakes except the sheer strake are roughly in line. This is a very unusual arrangement in any system of boat building and would appear to be a structural weakness. It is not a chance arrangement, but rather reflects the method and order in which the planks are assembled. Figure 21 shows a *compreng* in an early stage of construction. The bottom strakes of the midbody, *pengampit*, *karon* and *telon*, are all in place, and each has its *serang* extension fitted in the bow. At this stage no planks have been fitted in the stern. The reason for this is that the *serang karon*, *serang telon* and *serang cantel* will be tapered out in a smooth line below the sheer strake. Because the builder is working by eye (there are no patterns for cutting the shapes of the planks) the planks can only be tapered to this line when the mid-body *cantel* strake is in place.

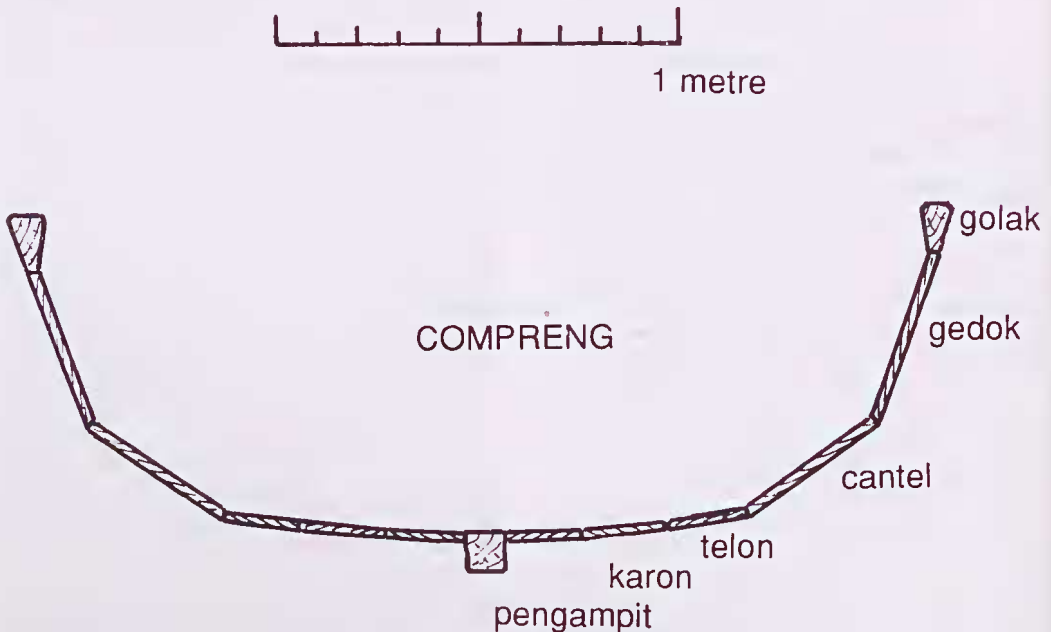


Fig. 19. Midsection of a *compreng* with strake names.

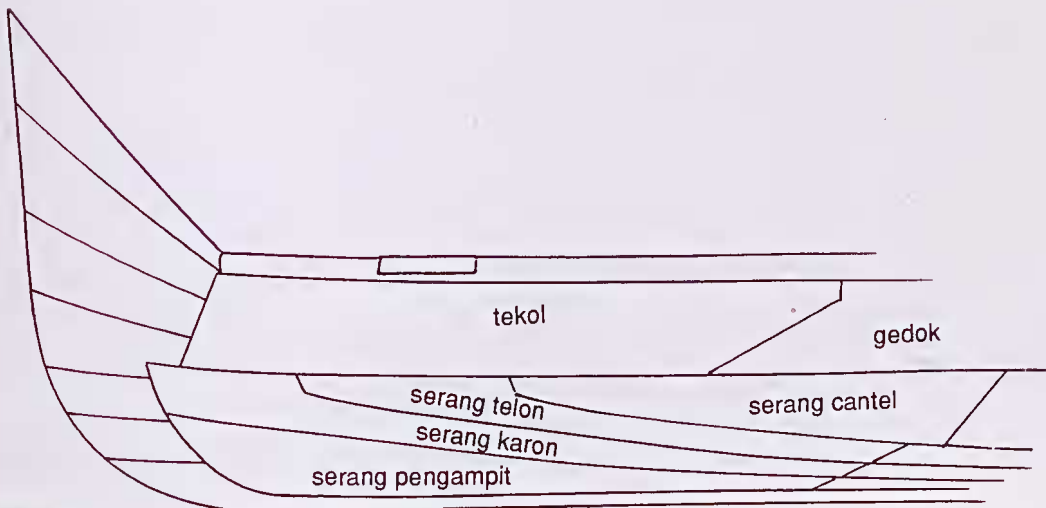
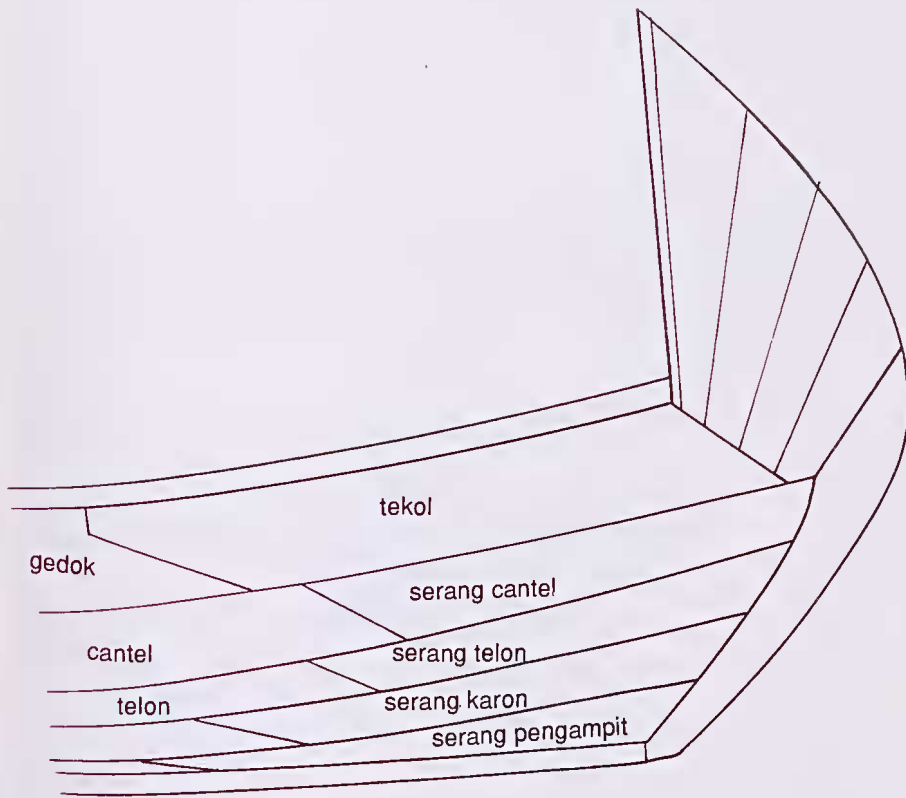


Fig. 20. Plank pattern of the bow and stern with plank names.



Fig. 21. The early stages of construction of a *comprang*: although the bow is already planked up, the planking of the after-body has not commenced.

The method of fastening the planks in the ends is noteworthy. The hood ends are secured to the stem or sternpost by four treenails which pass right through the stem or sternpost and through the plank on the opposite side of the bow or stern. These treenails are slightly tapered, two are driven in from each side. This is similar to the construction of many traditional craft on the east coast of Malaysia where vessels are built without a stem or sternpost and the planks simply meet in the ends: their stem and sternpost, which are largely decorative, are fitted after the planking is complete. The ends of the sheer strake of the *compreng* are not through fastened in this way, because where they are fastened, the *gemplo* is too thick to allow effective use of such a method.

Many builders of *mayang* now use steel rod to replace some of the treenails and edge dowelling in the construction. The Cirebon *compreng* builders have resisted this practice and regard it as undesirable, perhaps because steel pins used for edge dowelling the planks together rust and expand, and would probably split planks as thin as those of a *compreng*.

Planking. The plank pattern of the *compreng* is different from that of other *mayang*, but it is much the same as that of the *perahu* called *sopek*,

which are built by Sundanese boatbuilders around Labuan on the Java shore of Sunda Strait. Those *sopek* are not *mayang* according to the definition employed here: they are round bilged and their builders name six strakes in the construction.

Bulkheads. In a standard sized *compreng* there are 13 bulkheads which are fitted into the hull after the *cantel* (bilge strake) has been fitted. They are assembled outside the boat by edge dowelling planks together (Fig. 22), and they are then trimmed to fit precisely into the hull. No other framing is used. The treenails which fasten the upper planking are driven into the end grain of the bulkhead planks. This is not a particularly strong arrangement, but is apparently adequate. The bulkheads are evenly spaced, except for the three aft bulkheads which are closer together to support the spar crutch and the rudder mounting. The aftermost bulkhead, and the one right in the bow, are constructed of thicker timber; they are each a single plank with its grain running vertically to provide better fastening in these critical parts of the hull (Fig. 23). These two bulkheads are called *gading cempod* while the rest are simply called *gading*. These names, or similar names are usually applied to frames rather than bulkheads. For instance the frames in



Fig. 22. Building a bulkhead.

the bow and stern of *perahu jegongan* are called *gading cempit*, and at Kuala Terengganu in Malaysia they are called *kecaping*.

Rudder support system. The spar crutch and the rudder support post are stepped through a large thwart (*daporan*) at the level of the rail. The *daporan* projects slightly outboard like the *daporan* of the *kolek*, but in the *compreng* it is usually a single thwart rather than two, one above the other. Some large *compreng* do have double *daporan*; the builders say that it is simply a question of size, with a larger boat requiring the strength of the double thwart structure. However, *jegongan*, some of which are as large as the biggest *compreng*, always have only a single *daporan* thwart structure.

The use of double thwarts in the *daporan* structure is probably connected with traditional use of the *payang* net in conjunction with the tilted rectangular sail set from a stout single mast, and a strut connecting the mast to the spar crutch, which is stepped through the *daporan*. *Mayang* which are equipped with large *payang* nets are more likely to have the single masted rig and a double thwart *daporan* structure than *mayang* equipped for other methods of fishing. This is because at times during fishing opera-

tions the large net is hung from the strut, called the *andang*, which is fitted between the mast and the top of the spar crutch (*sanggan*) in the stern so that it can be dried and can be arranged and repaired. With the entire weight of the wet net supported by the *andang* there must be considerable lateral load transmitted to the spar crutch and then to the *daporan*, particularly if the vessel is rolling. *Mayang* such as *jegongan*, which usually carry sprit sail rig on light and easily unstepped masts cannot have a strong *andang* fitted between the mast and the spar crutch, but *jegongan* are not normally equipped with *payang* nets so there is no requirement for a strong *andang* and spar crutch and the double *daporan* is not required to step the spar crutch.

The *daporan* of the *compreng* is closer to the stern than that of the *kolek*. The rudder is lashed against a short projecting stick in the same way as in the *kolek*. The rail (*golak*) is interrupted by the *daporan* but there is no heavy timber extending the rail aft of the *daporan*. Outside the rail, aft of the *daporan*, carved boards are sometimes fitted: these are called *serang manis* or *kuping kuping*.

SOPEK

Sopek, like *kolek*, is a name that has been applied to a range of different vessels. The name here is applied to a type of vessel with a modified traditional *mayang* midsection and hull form, but with a straight stem and sternpost and lacking the large decorative prow of traditional *mayang*.

Recognition. *Sopek* are easily recognised by their straight stem and sternpost, which are cut off just above the sheer (Figs 24 and 25). In spite of their relatively plain construction and design, traditional decorative features are present in the carved rudder support post (*sumbi*) and the carved boards in the stern (*kuping kuping*).

Size. Most *sopek* are in the same size range as the *compreng*. A typical example measured 9.80 m l.o.a. x 2.36 m x 0.83 m. The largest are about 12 m in length.

Rig. The smaller *sopek* use the same two or three masted spritsail rig as the *compreng*, while larger versions can carry the tilted rectangular sail rig of the *kolek*. In fact, most *sopek* are fitted with a long-shaft outboard motor and carry only a small auxiliary rig. In many cases, large motorised *mayang* which are equipped with *payang* nets only retain the stout mast of the tilted

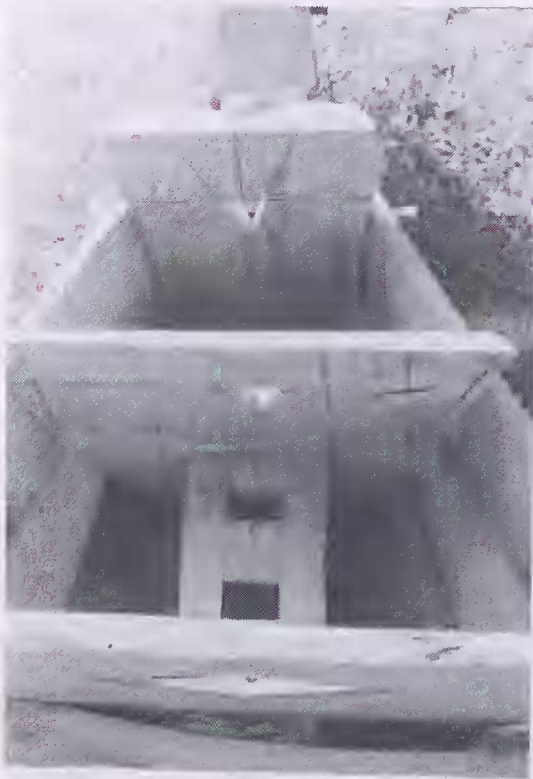


Fig. 23. The bulkheads in the stern and the longitudinal step for the spar crutch and the rudder mounting post.



Fig. 24. Sopek.



Fig. 25. Sopek.

rectangular rig because the strut (*andang*) which runs between the mast and the spar crutch in the stern, is used for hanging and drying the large net.

Use. Most *sopek* are employed along with the similar sized *compreng* in the inshore prawn and shrimp fishery. Larger examples work with *payang* nets or with longlines.

Distribution. *Sopek* are found in fishing fleets from Banten in the very west of Java all the way to Semarang in Central Java. East of Semarang the name *sopek* is used for a different type of *mayang* which is described below.

Recent history. The *sopek* is a recent, "rationalized" version of the traditional *mayang* design. The majority of *sopek* are today built around Cirebon, but, according to builders at Gebang, the design originated in Pemalang, Central Java. Possibly it is a kind of standardised West Javanese version of the Central Java *sopek* described below. It is now displacing the *compreng* and other traditional types in West Java and may eventually replace them altogether. There are two obvious reasons for this. The *sopek* must be slightly cheaper and easier to build with its simplified ends. For a standard sized vessel built at Gebang in 1990, builders were quoting 2.5 million rupiah for a *compreng* and 2.0 million rupiah for a *sopek*. (In 1990, one million rupiah was equivalent to approximately A\$ 700).

Perhaps more importantly, a *sopek* is expected to have a longer working life than a *compreng*. Relative figures of approximately ten years and seven years were given at Gebang. This seems to be because the *sopek* can be built with nar-

rower planks producing a more rounded section with less angle at the chines so the seams at the chines are under less stress and, protruding less, they might be less prone to damage. Also the scarfs are better staggered in the plank pattern. This is described below.

Construction. Keel, stem, and sternpost. The keel is straight and meets the stem and sternpost at a distinct angle. Typically the stem rakes forward at about 20° from the perpendicular, while the sternpost rakes aft about 35°, but there is considerable variation and many *sopek* have considerably more rake to the stem and sternpost. There is a rabbet cut in the stem and in the sternpost, but there is no apron in the bow or stern.

Midsection. Older *sopek* have a similar midsection to *mayang* such as the *compreng* or *kolek*. Larger *sopek* are still built with this form, however, most standard size *sopek* built in the Cirebon area now have a modified midsection which appears to be designed to overcome some of the structural problems of the *compreng*. The measured midsection in Figure 26 shows the same broad, slightly rounded bottom as the *compreng*. This example shows almost no deadrise which is the modern trend for both *sopek* and *compreng*. The *cantel* or bilge strake is divided into two narrower strakes with a chine between them. The sheer strake (*gedok*) is narrower. The section is more rounded especially above the first chine. The strake names in Figure 26 are those used in the Cirebon area. *Sopek* builders in other areas use other sets of terms derived from their own traditional terminology.

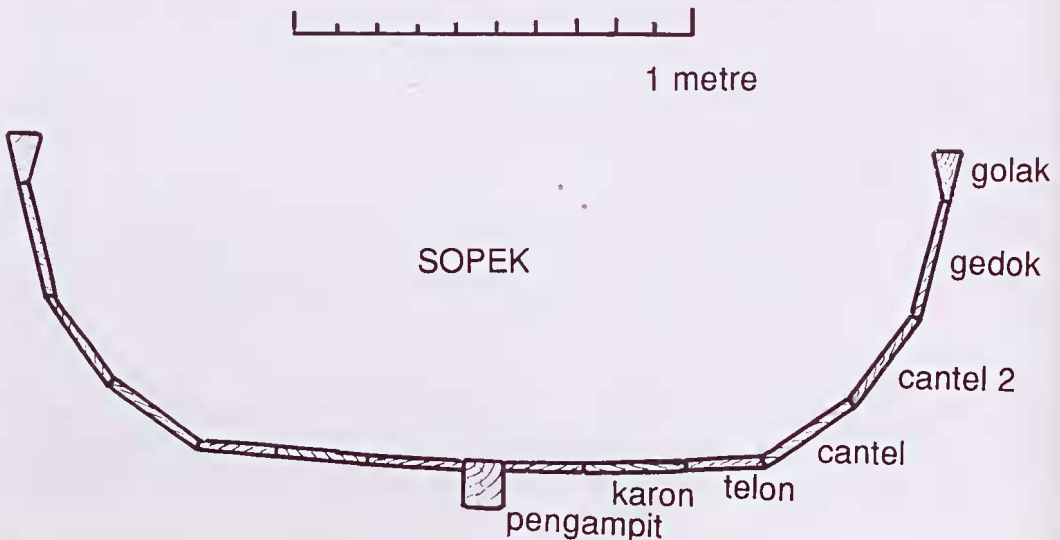


Fig. 26. Midsection of a *sopek* with strake names.

Planking. There are considerable differences between the planking of a *compreng* and a *sopek*, apart from the extra chine in the midsection. Forward, all the strakes run through to the rabbet on the stem. In the stern, the three strakes from the bottom of the hull are run through to the sternpost but the lower *cantel* is tapered out and so is the *gedok* or sheer strake (Fig. 27). In the bow the *tekol* - the forward plank of the sheer strake - is flared outwards and the rabbet on the stem is angled forward to accommodate this. In effect, this is the stylistic opposite of the inward angled rabbet for the *tekol* of the *compreng*. As with the *compreng*, four treenails are driven right through each pair of planks in the ends, two from each side (Fig. 28).

Bulkheads. A typical Cirebon built *sopek* has eleven bulkheads. This is, in fact, the same as for the *compreng* except that the *gading cempod* in the bow and stern are absent.

Rudder support. As for the *compreng*.

Other. A short foredeck provides both structural strength to the bow and uses the extra space in the bow (in comparison with a *compreng*) to advantage.

SEROTO

The typical *seroto* is not really a *mayang* according to the definition given in the introduction. *Seroto* are, however, of similar size and

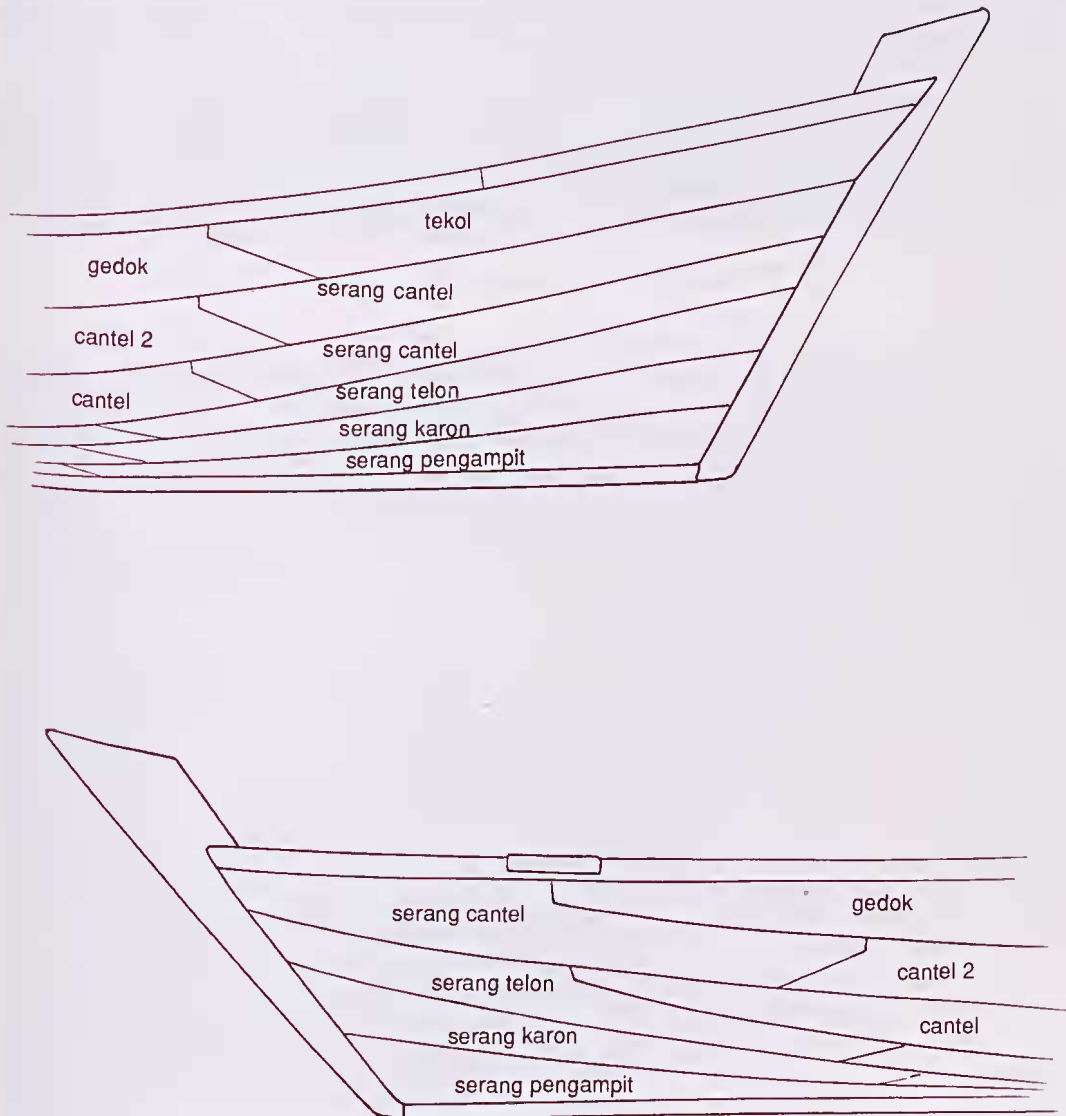


Fig. 27. The plank pattern of the bow and stern with plank names.

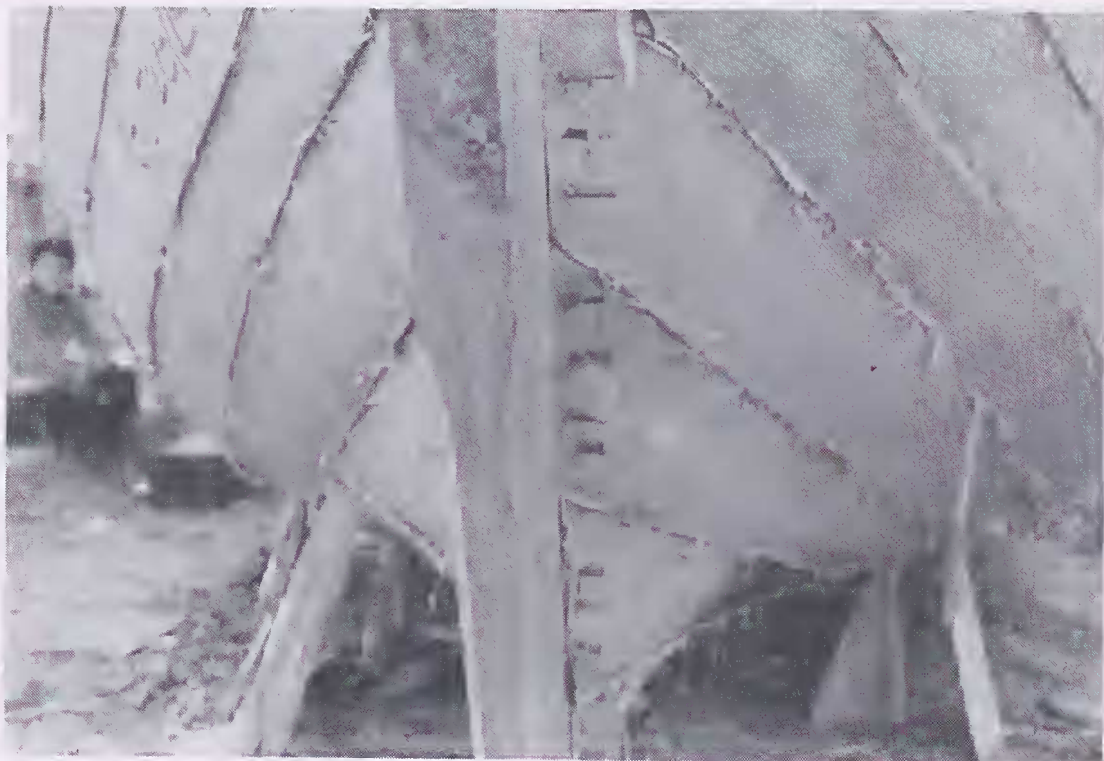


Fig. 28. The bow of a *sopek* under construction showing the treenails which fasten the hood ends of the planks.

function to *mayang* such as *compreng* and they are certainly a related design. Some small *seroto* do have a true *mayang* hull form.

Recognition. A graceful, fine ended craft with straight stem and sternpost which project well above the rail. The projecting parts of the stem and sternpost are built up on their inboard edges and have distinctive carved decoration (Fig. 29).

Size. The largest *seroto* are about 10 m l.o.a. x 3 m x 1 m. No precise measurements were taken. A number of derelict *seroto* of this size could be seen on river banks west of Cirebon, and a number of smaller *seroto* are still in use.

Rig. Two or three masted rig, as for the *compreng*. Smaller *seroto* usually do not have motors.

Distribution. Most are found in creeks around Indramayu and Krawang. A few operate from Cirebon and from Muara Angke, Jakarta. They are not very common today.

Use. The main employment of the larger *seroto*, if any still work, is in the longline fishery, particularly fishing for shark. Boats so employed are fitted with a stout timber windlass on the port side, just forward of the mainmast. Smaller *seroto* work along with *compreng* in the shrimp and prawn fishery.

Recent history. The *seroto* is a design that originated with the Malay population of the eastern Krawang and Indramayu district. Van Kampen (1909: 35) records that this type was usually called *djohoran* (i.e. of Johor, Malaysia). They were also called *trondalan* at Krawang and *soto* at Cirebon; the latter name is still used in the area of Indramayu. There was apparently a version built without stem called *soto depangan* recorded at Tegal (Van Kampen 1909: 35); this was possibly a *Bajau* ("Sea Nomad") *sope* from the Karimunjawa Islands to the north.

The Malay population of the Krawang-Indramayu region were maritime people, and some of them, at least, were probably from the islands lying off the coast of Johor which were inhabited by several groups of "Sea Nomad" people (Sopher 1965). The *seroto* and the *jegongan* (described below) both originated in the Krawang-Indramayu region and both have considerable affinity with the vessels of the *Bajau* who are the largest and most widely spread group of the "Sea Nomads".

In hull form, the *seroto* is unlike a typical *mayang* but similar to many of the fishing boats and small cargo carriers of the east coast of Malaysia. They have less beam than a *mayang*



Fig. 29. The bow of a *seroto*. The rounded hull form is very obvious.



Fig. 30. The stern of a *doret*, a rare hybrid type with the hull form of a *seroto*.

and a much more rounded bilge: the turn of the bilge starts almost at the keel and continues virtually to the rail. However, the *seroto* does have some of the construction features of a *mayang*, particularly the *compreng* from the neighbouring Cirebon district. Some small *seroto* in the Cirebon district have been built with the construction and hull form of the *compreng* but they are finished with *seroto* style prow and stern. They are really just a stylistic variant of the *compreng*.

There appear to be no *seroto* of recent construction. It seems that the type is no longer built and will soon cease to exist. The larger *seroto* probably required ballast to sail whereas a *mayang* is never ballasted. Also a *seroto* in sailing trim would draw considerably more water than a *mayang* of comparable size. With their fine ends they would probably have been quite swift sailers but with the introduction of motors that capability is no longer an advantage.

Construction. Keel, stem, and sternpost. The keel is straight and meets the stem and the sternpost at a distinct angle. The stem rakes forward only about ten degrees from the perpendicular while the sternpost rakes aft about 25°. The high prow piece is built from the projecting stem, and a plank sweeping up from the rail on either side which is faired on to the aft face of the stem. There is a capping piece on the top of this structure. The projection at the stern is constructed on the sternpost in the same way as that at the bow is constructed on the stem. There is a rabbet on the stem and on the sternpost.

Figure 30 shows the stern of a derelict vessel called a *doret*: it had a similar hull form to a *seroto* including straight stem and sternpost but the decorative structure on the stem and sternpost is quite different. Formerly this decorative structure was found on *mayang* called *kolek poekat* (*pukat* in modern Indonesian orthography is a type of net) from Bantam, West Java (Van Kampen 1909: fig. 1).

Midsection. A measured midsection has not been obtained but Figure 29 gives a good idea of the shape. There are no chines, instead the section curves gently through a very slack bilge. There is much less beam relative to depth in the midsection.

Planking. The forward plank pattern of a disused *seroto* is shown in Figure 31. There are long planks which run through the midsection of the hull but the strakes finish with strange, irregular pieces in the bow. Possibly this was a repair; alternatively it is a scruffy adaptation to the use

of sawn timbers in a design that formerly had bow and stern pieces carved to shape like the *sopo* and *lepa* of the Bajau. The shape of the bow is achieved by a gradually curving in from the midsection of the long midbody planks, rather than curving in more abruptly with *serang* planks as it is on a *mayang*. This produces a very long, sharp entry.

In the stern the plank pattern is rather like that of the *compreng* but adapted for the use of several more strakes than the usual five strakes of the *compreng* (Fig. 32). The strakes which run through the turn of the bilge are tapered out under the topside strakes in the same way that the *karon*, *telon* and *cantel* strakes taper out under the sheer strake in the *compreng*. The stern is considerably fuller than the bow. (Neither the plank pattern in the stern, nor the relative fullness in the stern, appear to be features of any traditional Malay boats, as far as one can tell from the literature.)

Bulkheads. A large *seroto* that was surveyed had 15 frames; most of these were bulkheads, but some were conventional sawn frames. Bulkheads are not a feature of Malay boats.

Rudder support system. The rudder support post and spar crutch are stepped through a single *daporan* thwart. In some cases the thwart is strengthened by a beam on its forward edge (Figure 32). The rudder rotates in the cleft formed where a diagonally extended stick crosses the rail. This is similar to the arrangement on the vessels described above except that the stick is fixed in place and cannot be unshipped. For this reason there is a stick fitted on each side of the stern. Having these permanent projecting structures in the stern precludes the use of *payang* (seine nets) because the net would foul on the projection while being shot.

The rudder of any *mayang*, and also the *seroto*, can be unshipped from the rudder support post and used as a sweep or steering oar, pivoting

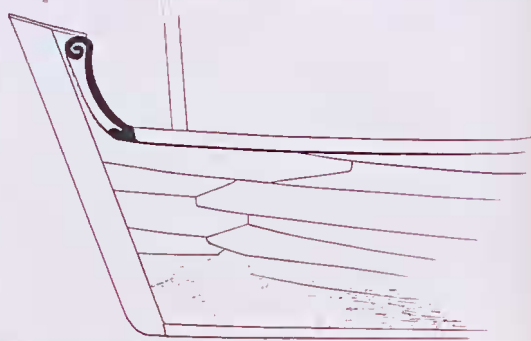


Fig. 31. The plank pattern of the bow.

JEGONGAN

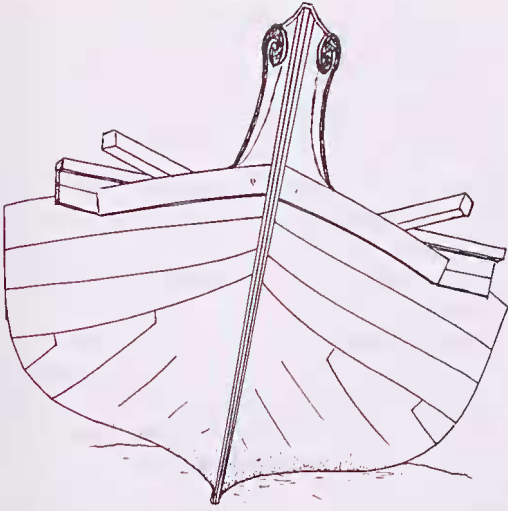


Fig. 32. The plank pattern of the stern and the rudder mounting structure.

where it is lashed to the rail. This is normal practice when manoeuvring in shallow water. Some traditional Malay vessels only use a sweep in this way, lashed against the lee quarter, even in deeper water. The majority of them lack the rudder support post and tiller that make it possible to convert the sweep into a rudder which rotates on its longitudinal axis.

The *jegongan* differs from all other *mayang* types in both the shape and the construction of its ends. Apart from being an attractive and distinctive vessel, it is interesting because of the similarity of its ends to those of the *lepa* and *sope* of the *bahasa sama* speaking Bajau or Bajo people. The Bajau have spread over much of island Southeast Asia, but they are not now distinguishable as a separate ethnic group in the population along the coast of Java. *Sope* and *lepa* are discussed in detail in Burningham (1993).

Recognition. The *jegongan* is easily recognised even at a distance by the vertical ends and the high prow and stern finials (Fig. 33). Closer inspection reveals that they are built entirely without a stem or stern post. Most *jegongan* are only partially painted with a bold decorative design bearing the boat's name while other parts of the planking are left as bare timber. This can be seen in the text figures illustrating the *jegongan* (Figs 33, 34).

Size. Lengths range from about 5 m to 11 m. A large example measured 11.35 m x 4.26 m x 1.47 m. Though not as long as the largest *kolek*, a large *jegongan* is a vessel of similar or greater



Fig. 33. Jegongan.

register tonnage because of its greater beam and moulded depth. Smaller *jegongan* usually have less capacious lines with less moulded depth relative to length. Both large and small *jegongan* are fairly common in the area in which the type is popular, and in this respect they differ from other types of *mayang*, because examples of other *mayang* types are mostly of one standardised size for their type.

Rig. Two or three masted spritsail rig, similar to that of the *compreng* (Fig. 34). Most *jegongan* today are motorised, especially the larger examples. In this case they usually have a small tilted rectangular sail or a triangular boomed lateen sail as auxiliary sail power. This rig is carried on a permanently stepped mast rather than the light easily unstepped mast of the sprit rig, and it allows the fitting of an *andang* between the mast and the spar crutch in the stern. Some *jegongan*, used for *payang* fishing, may have carried a large tilted rectangular sail, like the *kolek*, in the past.

Distribution. *Jegongan* are mostly found on the coast from Jakarta, eastwards through Krawang to Indramayu. The larger ones are concentrated in the major fishing ports of Muara Angke (West Jakarta) and Eretan. They are almost unknown at Cirebon in spite of the proximity to Indramayu. All *jegongan* are apparently built in the Kandang Huar district just to the west of Indramayu. The main building centre for the larger *jegongan* is the village of Parcan, a little to the east of Eretan.

Use. The smaller boats are used for a variety of fishing methods, but the larger *jegongan* are used mainly in the longline fishery, for which they are the favorite vessel. The offshore longline fishery demands fairly long voyages, ten days at sea being typical, and it is carried on throughout the year with no interruption by the northwest monsoon except when conditions are extremely stormy. To obtain the necessary sea keeping qualities, *jegongan* are built with greater moulded depth to give greater freeboard than



Fig. 34. A small *jegongan* under sail. The mizzen is unstepped, the rake of the mainmast is variable.

other *mayang* types. This makes them less suitable for handling large *payang* nets.

The *jegongan* travel considerable distances to fish off the coast of Sumatra and far out into the Java Sea. Frequently a ten day voyage will involve only four days of fishing and six days of sailing to and from the fishing grounds. They carry large quantities of ice to preserve the catch. *Jegongan* from Muara Angke, Jakarta, fish along the south coast of Sumatra, setting 600 hooks in about 50 metres of water.

Recent history. Van Kampen (1909:35) mentions a type called *jegong* from Krawang but a sketch of the bow (Van Kampen 1909: fig. 35c) shows that this was a forerunner of the *compreng* type rather than the *jegongan*. In the Indramayu area, vessels with a bow profile similar to the *jegongan* and built without a stem were common (Van Kampen 1909: fig. 35a, pl. 7), but they were smaller than a modern *jegongan* and did not have the construction or form of a *mayang* in their midsection. They appear to have been very similar to the *perahu sope* of the Bajau, both in construction and hull form. Since the *sope* is such a distinctive type, it is reasonable to suppose that they were a closely related type of vessel.

Along with a variety of other small craft, these small *jegongan*-like vessels were generally known as *jukung* at Indramayu. There was a type distinguished as *jukung jegong* but Van Kampen does not indicate its design. Regarding the naming of these various small craft without the curved stem of the *mayang*, Van Kampen (1909: 34) offered the comment that "In the naming of these craft, there prevails even greater confusion, if that were possible, than among the *mayang*" (our translation).

Today the term *jegong* is used to mean plank or strake in the plank naming terminology of the Indramayu area. Perhaps the name *jegongan* indicates a planked boat rather than a built up dugout which is what the original *jegongan*-like boats seem to have been. There is an example of a *jegongan*-like boat on display in the Museum Bahari, Jakarta. It has a stem, but the stem is merely an external addition to the hull and has no structural function. Two interesting features of this vessel are that it is built up from a small dugout base, and that the *serang* - the forward planks - of the lowest strake are not formed from sawn planks but rather they are carved bowl shaped pieces, fashioned from thick baulks of timber (as a non-nautical term, *jegong* means bowl-shaped in Javanese). These two construc-

tion features are the essential characteristics of the *sope*.

The modern *jegongan* is built entirely from sawn timber and it has a midsection and hull form that are characteristic of the *mayang*. The stemless construction, the standardised structural design which is of high quality, and the characteristic traditional decoration, all tend to suggest that the *jegongan* is a long established traditional vessel. In reality, it seems to be a recently developed hybrid of two distinct traditions: the Javanese *mayang* and the Bajau *sope*. The literature is not adequate to indicate when it originated, but the absence of the *jegongan* type from a 1944 British Defence Department catalogue of fishing and trading craft of Indonesia (Naval Intelligence Division 1944) might well be significant since the modern *jegongan* is a notable seagoing vessel of the region.

Construction. *Keel and ends.* The keel is straight; there is no stem or stern post. The ends of the strakes are simply fastened to each other. When the plank shell is complete, an apron timber is fitted; it is called the *topeng topeng*.

The high finial at each end is called the *ceruk*. The *ceruk* is built from two shaped baulks of timber notched into the rail, port and starboard, and a third piece of timber which is fitted in the middle to fill the inboard part of the structure. However if the port and starboard baulks are sufficiently thick, then no filler piece is used. The structure is not capped.

Midsection. The midsection of a typical Parean *jegongan* is less angular - the chines are less distinct - than most other types of *mayang*. *Jegongan* built in other places tend to have more distinct chines. Chines are not a feature of the *sope* type. The terms used to name the planks vary according to the background of the builder. Some builders use terms similar to those used by *kolek* builders, others use *compreng* terms. The terms shown in Figure 35 were supplied by the head builder at a small yard in the *kampung* of Parcan Girang. This man said he was sixty five years of age and that he had been building *jegongan* for all of his working life. At the time he was interviewed by Stenross, he was supervising the construction of four, full sized, craft. The measured midsection shown in Figure 35 is taken from one of the vessels shown under construction. The bottom is gently curved. The strakes which form the bottom are not individually named: they are all called *jegong* and can be designated by number. The outermost of the

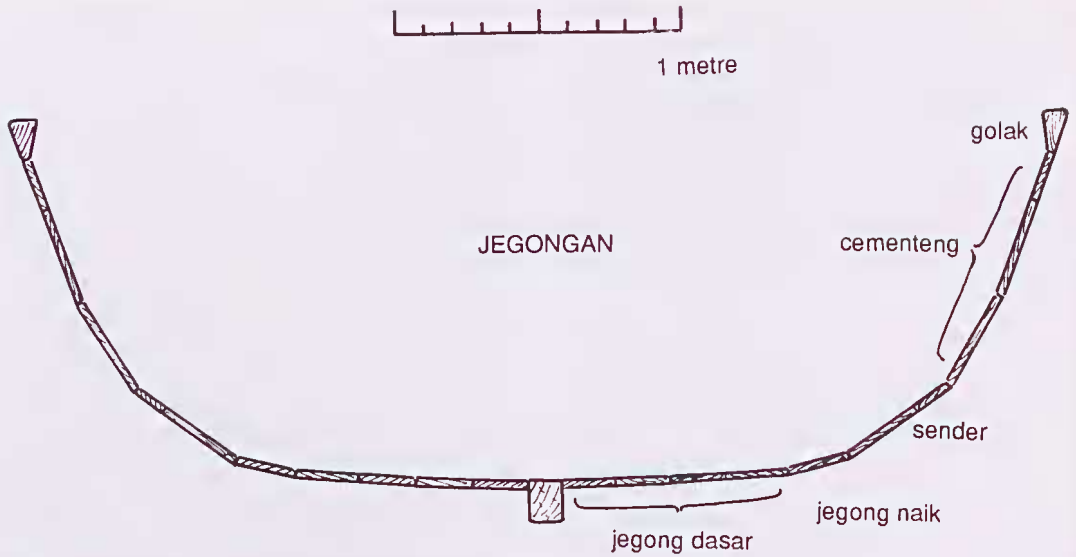


Fig. 35. Midsection of a *jegongan* with the strake names.

jegong, in this example, shows a distinct increase in the turn of the bilge, but this is not a feature of all *jegongan*. The bilge strake is called the *sender* and the topside strakes are all part of the *cementeng*. The sheer is capped with a heavy rail timber called the *golak*.

A midsection and the strake naming terminology from another yard a few kilometers away are illustrated in Figure 36. Here the second named strake is called *karon* and the next strake is called *sender* or *selender*. Other terms are the same. This midsection shows three distinct chines.

Planking. The planking pattern of the *jegongan* is notable for lacking the peculiarities that distinguish most other types of *mayang*. Plank patterns vary somewhat in pragmatic response to the size and lengths of plank available. The plank pattern in Figure 37 shows all the scarfs between the midbody and the end planks rather too close to each other for optimum structural strength (in technical terms, there is not adequate shift of the butts); this probably reflects use of a standard plank length for all the planks and a desire to achieve minimum wastage of tim-

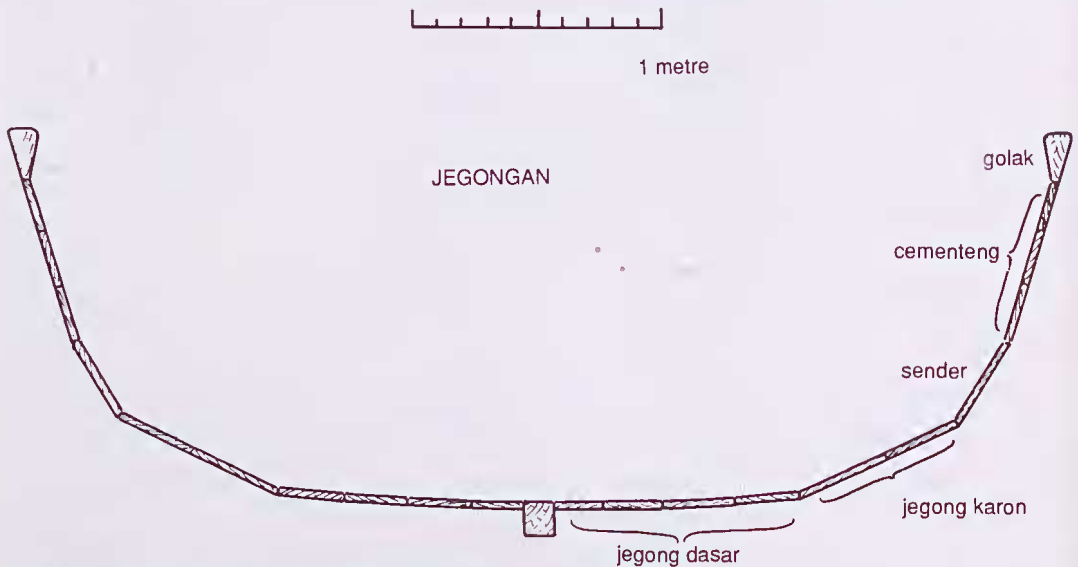


Fig. 36. Midsection of a *jegongan* with a different shape and different strake names.

ber. The plank pattern is the same in the bow as in the stern (Fig. 37). The scarfs in the planking were called *sambung laras* at Parean, a term that was not encountered elsewhere.

In the construction of a *jegongan*, each strake is completed before the next one is commenced. This might seem like a statement of the obvious, but it is, in fact, different from the assembly sequence of other *mayang*.

Bulkheads. A typical full size *jegongan* has ten bulkheads and two frames, one at each end of the hull. The bulkheads are constructed differently from those of the *kolek*, or the *compreng*, in that their construction incorporates proper sawn frames and it is the top pieces of these frames which project above the thwarts and strengthen the upper part of the plank shell.

Rudder support system. This is slightly different from the arrangements described above. The post which supports the top of the rudder stock (*sumbi*) is stepped through a single *daporan* thwart. This thwart is further aft than in other *mayang*. The rudder does not pivot in a cleft formed at the intersection of the projecting stick and the rail. Instead it is lashed into a notch on the aft edge of the *daporan* thwart. This ar-

rangement is similar to that used on some *perahus* from Madura and especially those from the islands lying east of Madura. It is a combination of the system of rudder mounting found on the traditional craft of the Sulawesi tradition and also many Bajau craft, with the Javanese system; a system which allows the head of the rudder stock to be taken off the mounting post so that the rudder can be used as a sweep for manoeuvring and in shallow water.

JEPARA SOPEK

The name *Jepara sopek* is used here to distinguish these vessels from the distinctly different *sopek* of West Java described above. They are mainly built and used along the coast of the large promontory of land between Semarang and Rembang. The largest town, on this somewhat isolated coast, is Jepara.

Recognition. Like the West Java *sopek*, this type is a relatively plain design lacking any remarkable decorative structures that can be easily distinguished at a distance. Furthermore, there is considerable stylistic variation in features such as the rake of the stem and stern post, and the projection of the prow finial. This variation is found when comparing *sopek* from different villages and especially *sopek* of different sizes. Nevertheless, a number of features distinguish the *Jepara sopek* as a distinct type of *mayang*.

The stem and stern post are nearly straight and the rabbet on the stem and on the stern post is very nearly straight, or actually straight, in many cases. There is no structurally separate *linggi* but the top of the stem forms a sharp projection and the upper part of the stem is decorated with a characteristic spiral design (Fig. 38). There is a second prow finial immediately abaft the stem, formed by the upswipt conjunction of the port and starboard rails where they meet at the bow (Fig. 38). Though it serves no structural function, it is related in structure, as well as form, to the prow finial of the stemless *jegongan* and the Bajau *sope*. Similar finials are found on some *perahu* of East Java, Madura and the islands east of Madura. Most of these types have a similarly structured finial in the stern, just forward of the stern post. On the *Jepara sopek*, the stern finial is either absent or it is formed from a single block of timber simply held in place by dowels (Fig. 40). On the Madurese *perahu golek* the forward finial is styled so that its bipartite structure is evident, while the finial in the stern has a filler

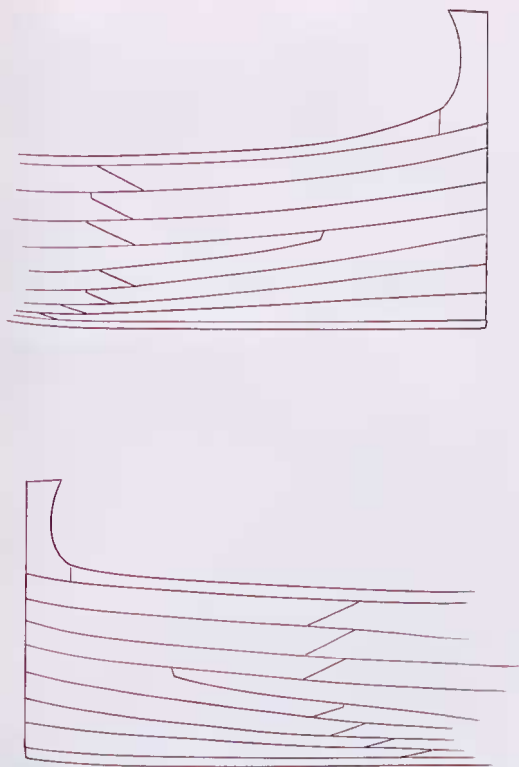


Fig. 37. Plank pattern of the bow (above) and the stern (below) of a *jegongan*.



Fig. 38. Jepara *sopek*.

piece between the two projections of the rail; thus it appears to be a single block in the way that the stern finial of the *sopek* actually is a single block.

Another distinctive feature of these craft, is the spar crutch, formed by an extension of the top piece of a frame, on one or other side of the vessel and positioned well forward. Similar spar crutches are a standard feature of most traditional Malaysian fishing craft and many of the boats used by the Bajau in different parts of Southeast Asia.

The smaller Jepara *sopek* tend to have very fine lines with relatively little beam and considerable rake to the stem and stern post. The larger *sopek*, particularly those from Juwana on the eastern side of the Jepara promontory, are sturdy looking, capacious vessels with considerable beam and relatively upright stem and stern posts.

Size. The smallest *sopek* are no more than 4 m in length: with little beam and moulded depth they are not much more than canoes. The most common size is approximately 9 m x 2.8 m x 1.08 m; the largest are nearly 12 m in length and have similar relative proportions.

Rig. The most common rig was the two masted sprit rig, but today, very few *sopek* are operated without a long shaft motor and the majority of



Fig. 39. Internal view of the bow of a Jepara *sopek*.

the motorised *sopek* carry one or two *lete* sails set on very short masts like the small Madurese *lisalis*. This rig is illustrated in Horridge (1986: pl. 14). The sprit sails formerly carried by many Jepara *sopek* were of very square headed shape, with a rather short foot and leach.

Use. The various sizes of *sopek* are used for a variety of different fishing techniques including *payang* net fishing in the case of the larger vessels. Quite a number appear to serve as tenders to the many large stationary fish trapping platforms that are built in the shallow bight between Jepara and Semarang.

Distribution. These *sopek* are common everywhere between Semarang and Juwana. There are many of them at Jepara and some are built there. Two major building centres are Wedong, near Demak in the west, and Juwana in the east.

Recent history. This is another type of *mayang* which has not previously appeared in the literature, apart from a brief and imperfect description in Burningham (1989: 204). In styling and in some detail it shows affinities with the traditional craft which seem to have originated from the islands to the east of Madura. However, the men who build and operate the *sopek* in the area of Jepara speak Javanese and consider themselves to be of Javanese descent. Possibly the design has its origins with the mixed population of the off-lying Karimunjawa Islands.

Construction. Keel, stem and sternpost. The keel is straight. In some small craft it is broad and shallow, and is a median plank rather than a structural keel. The stem and sternpost meet the keel at a distinct angle. Both are slightly curved and the rabbet on the stem and on the sternpost is also slightly curved. The sternpost is more raked than the stem. There is a complete apron in the bow and the stern. The bow apron reaches from the keel up into the rail finial. The stern apron finishes below the rail. The apron is always carefully fitted, whereas the apron of the *jegongan* (the only other type which normally has an apron) is rather roughly fitted.

Midsection. In many of the larger *sopek*, the shape of the midsection is relatively deeper and fuller than that found in most other *mayang* types. The chines are often less distinct because there are always more than two chines in the midsection; it is a multi-chined form, and in some cases almost a round bilged form. Figure 41 shows a typical example of a large *sopek*. The smallest *sopek* have only four strakes, in which case there are three chines.

Not all builders of *sopek* have a complete set of strake terminology. The terminology shown in Figure 41 is a mixture of simple enumeration and traditional Javanese terminology used by builders of *kolek*. The top plank is called the *golak*, a name usually applied to a rail or cap-



Fig. 40. The stern of a Jepara *sopek*.

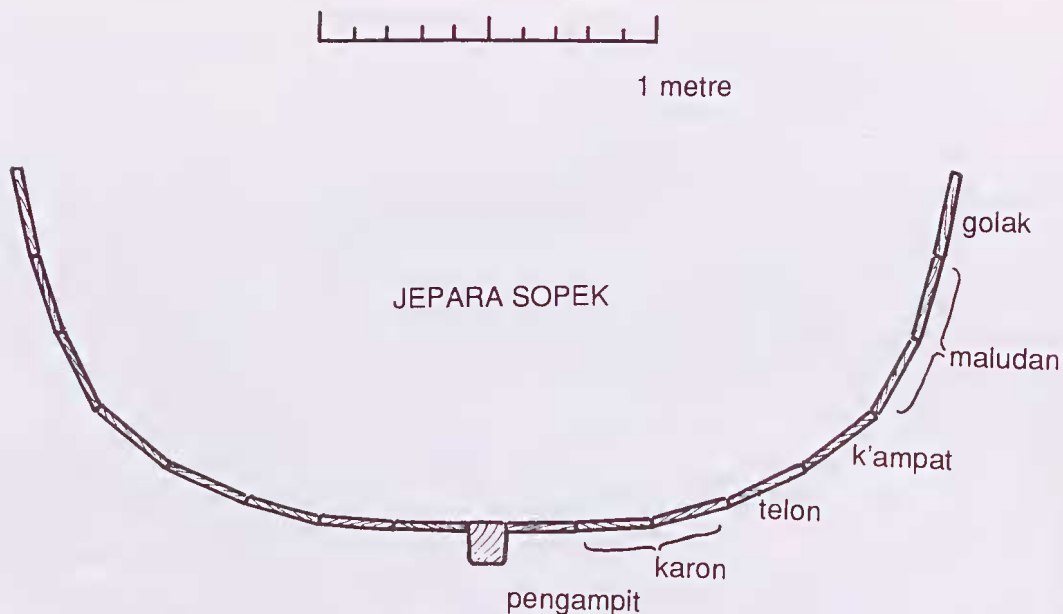


Fig. 41. Midsection of a Jepara *sopek* with strake names.

ping piece. Although this *golak* is only the same thickness as the planking, it is, in fact, fitted as a rail or washstrake on top of the planking (Fig. 42).

Planking. The *pengampit*, or garboard strake, is ideally a single plank from bow to stern. If this is not possible, it is joined in the middle to keep the join away from the area where the plank is twisting from the horizontal flat bottom of the midsection, to the vertical, in the ends. The other strakes which run through the lower part of the hull have their joins towards the ends of the hull, which is typical of *mayang* construction. The joins are staggered to avoid creating lines of weakness in the plank shell. The strake terms

apply to the long planks which run through the midbody while the planks in the ends are the *serang*.

As with the *jegongan*, each strake is completed before the next one is commenced, and the plank pattern in the bow is the same as in the stern. In the lower strakes, there is little tapering of the planks, so these strakes sweep up high on to the stem and sternpost. For this reason only the lower strakes reach the ends of the hull. The upper strakes run out under the rail (*golak*) towards the bow and stern. The top strake, the *maludan*, is quite short and has no *serang* extensions. This is the same kind of upper plank pattern as in the *kolek* and other related types.

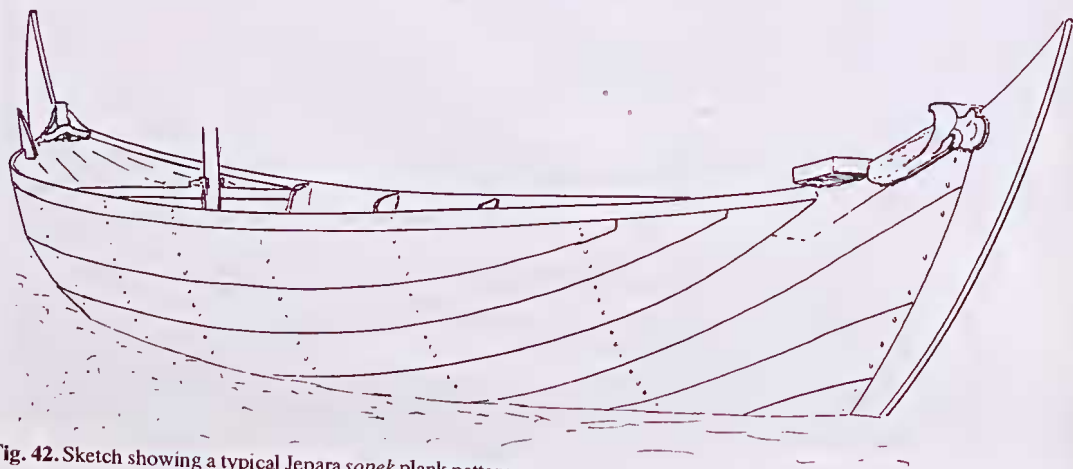


Fig. 42. Sketch showing a typical Jepara *sopek* plank pattern.

Large Jepara *sopek* are often built with good quality teak planking of more than 30mm thickness. Most of them are very carefully constructed with very tight seams and very precise smooth lines in the run of the planking. The standard of workmanship in the area is arguably the highest in all of Java and Madura, and the Jepara *sopek* are said to be the most durable of *mayang*. The Jepara area is also noted for the excellence of the local furniture makers and wood carvers who utilise the teak available from local plantations.

Bulkheads and frames. These vessels are not heavily framed but presumably they are quite strong enough, thanks to the excellence of their shell construction. A typical 9m boat will have eight or nine sawn frames. Some of these in the midbody will be filled in as bulkheads but they are essentially constructed with frames rather than bulkheads. A frame in the bow is extended above the rail to form a bitt or bollard and, as noted above, it can be used as a spar crutch. Usually this extended frame is on the port side.

Rudder mounting system. The *daporan* thwart, which projects well outboard is located right in the stern. The rudder pivots against the aft edge of the thwart, as in the *jegongan* and some craft originating from east of Madura. Few, if any, Jepara *sopek* are fitted with a rudder support post: the rudder usually has a tiller but it is

used as a sweep rather than a rudder. Many of the traditional fishing craft of the Malay Peninsula are steered in this way. It is not certain whether *sopek* were originally steered in this way; it is possible that in the past, before the advent of auxiliary motors, *sopek* would have had a rudder support as a standard fitting. However, a photograph at the Jepara Tourist Information Office (*Dinas Parawisata*) shows a number of *sopek* racing under sail and they are steered with the rudders used as sweeps.

KONTENG

The *konteng* is one of the most numerous and economically important of the *mayang* types. It has been described and illustrated, in some detail, in Burningham (1989: 206-8, figs 1-6). Many features of the construction indicate a close relationship of the *konteng* to the *kolek*.

Recognition. The *konteng* is a conspicuous and easily identified craft. At a distance it can be distinguished by the very high pointed stem. The stern also has a distinctive profile. Most *konteng* have extraordinarily vivid paintwork. The bright and ornate paintwork is applied in the yards where the *konteng* are built; most yards use the same design, but some have their own



Fig. 43. *Konteng*.

distinctive variation of the design. Figure 43 shows a typical example. Just abaft the projecting stem there is a ladder (*pantok*). This is carried on many *konteng*, but not all: in some cases the uprights of the ladder are elaborately carved.

Size. Nearly all *konteng* are of the same standardised size. A typical new boat measured 12.2 m x 3.71 m x 1.4 m. This is a little larger, and relatively a little deeper than *Terima Kasih*, the example illustrated in Burningham (1989) which was built during the 1970s. A few *konteng* are built a little larger and with noticeably greater moulded depth. These vessels are intended to be used for longer voyages. Smaller *konteng* are also built occasionally.

Rig. The *konteng* carry a large quadrilateral sail. Because the sails are now cut with the luff very short and angled aft (Fig. 44) they often appear to carry a triangular sail when seen from a distance. The rig illustrated in Figure 44 is somewhat different from the rig illustrated previously in Burningham (1989: fig. 5). The inaccuracies in the earlier illustration were the result of measuring the spars but not having the space to fully unfurl and set the sail of the vessel, which was then in storage.

The upper spar has a very distinctive shape with a strong downward curve at the aft end. It

is a very heavy spar made up of several large lengths of teak laminated together with hundreds of seizings or frappings of monofilament fishing line. The aft end of the spar, where it is curved, is thin and flexible; it twists to spill wind from the leach of the sail in gusty conditions. There is usually a long decorative "horsetail" made from strips of old inner tube or cassette tape hanging from the aft tip of the spar. Often, ribbons of gathered, brightly coloured cloth are flown from the leach of the sail and from the backstay. The sail can be furled by rolling it up on the lower spar and leaving the heavy upper spar at the mast head. In port, the upper spar is usually lowered. The full rig is still much used although many *konteng* now have an auxiliary long shaft engine which can be used to propel the vessel or to power a winch.

Use. *Konteng* are used mainly for fishing with *payang* nets. Others are used for longlining. Around Jepara and the Karimunjawa Islands quite a number of *konteng* are equipped for fish trapping with large horizontal nets set from long booms extended from the port side of the hull. Occasionally large *konteng* are converted to work as inter-island cargo carriers, particularly at Sedayu Lawas in East Java. Some *konteng* from Sedayu Lawas have been built up to more than

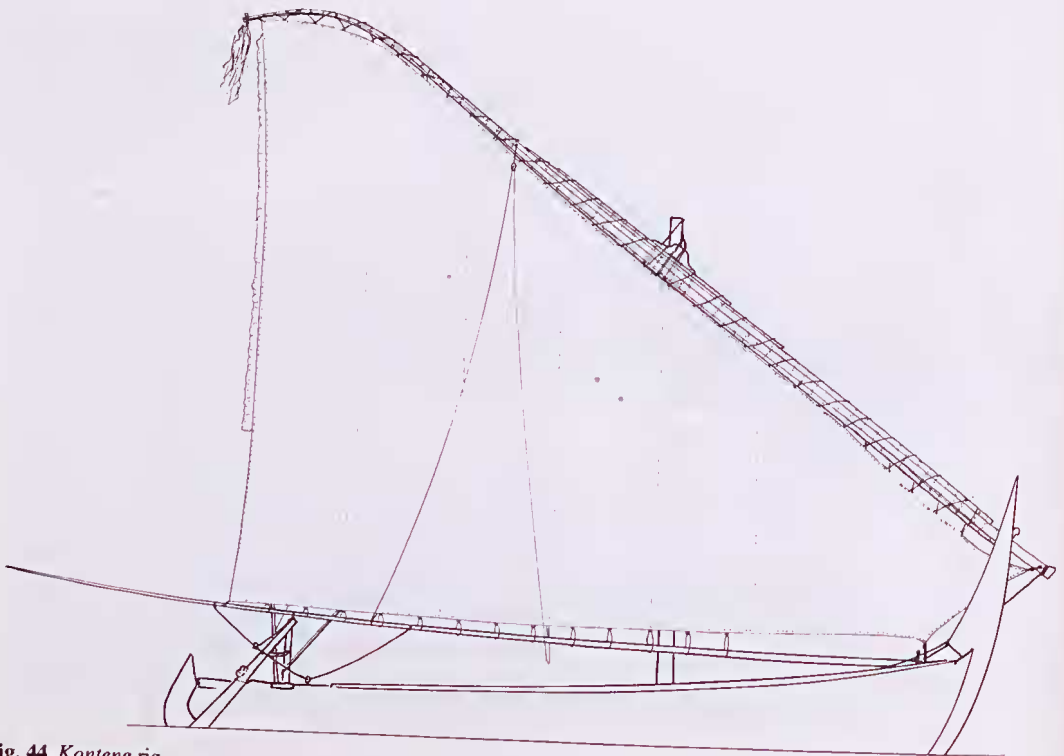


Fig. 44. *Konteng* rig.

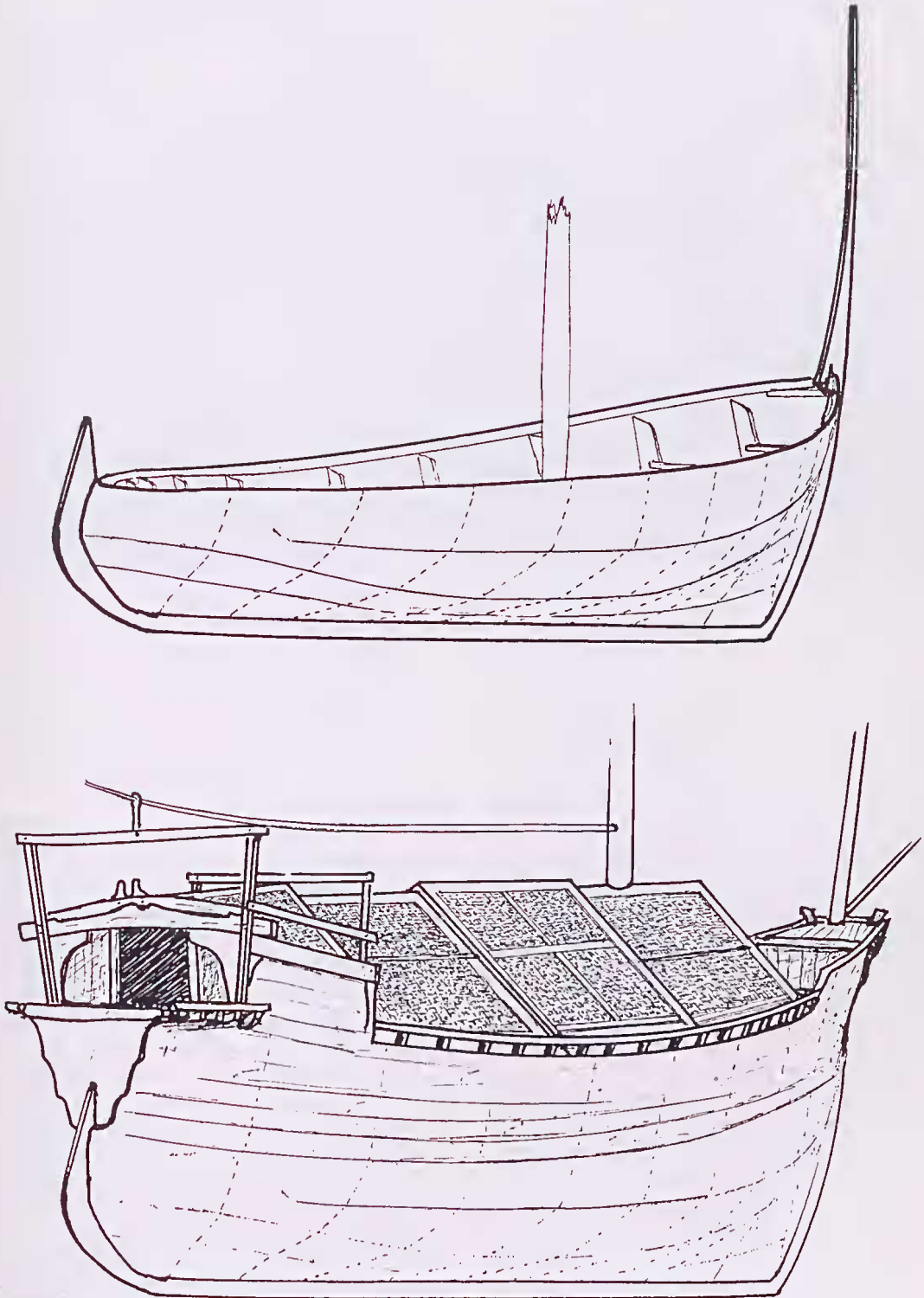


Fig. 45. A *konteng* hull (above) and a *cemplok* (below) built up from a *konteng*.

twice their original moulded depth, given a large deckhouse and a two masted *lete* rig. These built up vessels are usually called *cemplok* or *cemplong* (Fig. 45).

Distribution. All *konteng* are built in the twinned villages of Blimbing and Brondong, in the isolated *Kabupaten* of Lamongan, which is east of Tuban in East Java. The fishing harbour at Brondong-Blimbing is one of the largest and most colourful in all of Indonesia. *Konteng* from these villages are sold to owners from many other places in Java, especially Jepara. They can sometimes be seen among the *kolek* fleet at Jakarta, but they are not normally found in the Madura Strait area, or in the fishing villages on the north coast of Madura.

Recent history. The names *konting*, *koenting* and *koentingan* are mentioned in Van Kampen (1909: 28-31) as types of *mayang* but no description is offered except that the *koentingan* was a very small vessel for line fishing. Nothing that looks much like a modern *konteng* is illustrated in Van Kampen (1909). However, Macknight (1977: 6) shows an excellent photograph of a *mayang* "from probably around the turn of century ... off the coast of North Java". This *mayang* has a *kolek* style stem and sternpost but has the unmistakable rig, plus certain characteristic decorative features, and the powerful lines of the Brondong-Blimbing built *konteng*. However, there is no way of knowing whether the vessel in the photograph was, in fact, built at Brondong-Blimbing. The Lamongan area is not mentioned as a boat building area by Van Kampen (1909). Possibly the vessel in the photograph was a *mayang* built at Rembang, which is not far to the west of Lamongan, and was, at the time, the foremost centre of *mayang* building. Although the exact location at which the vessel in the photograph was constructed is a matter for conjecture, it is reasonable to conclude that the vessel, which shows considerable similarity to the modern *konteng*, was an example of a type of *kolek*-like *mayang* built in the Tuban-Rembang area. The modern *konteng* seems to have developed from that *mayang* with a new profile to the stem and stern, but retaining the distinctive rig and overall look. The tall pointed stem and the inboard curve of the sternpost both resemble the styling of certain types of Madurese *perahu* which are also recently evolved styles.

In recent years, fewer and fewer *konteng* have been built. The boat builders of Brondong-Blimbing have, increasingly, been building

larger motor driven fishing craft of more modern design. These vessels, like the *konteng*, are very well built, and although they are not of a traditional design they are rakish, handsome craft by comparison with most other modern fishing vessels built in Indonesia.

Construction. Keel, stem and sternpost. The keel is straight and usually is of considerably greater width and depth than the keel of most other *mayang*. The stem, which is slightly curved and less raked than in most other *mayang* meets the keel at a distinct angle forming a sharp forefoot. The stem projects high above the bow, tapering to a point. The broadened part of the stem, just above rail is not supported or attached to the hull: this is a structure that it has in common with the *kolek*.

The sternpost is very curved, it does not meet the keel at a sharp angle but gradually curves up from the keel and the upper part hooks back inboard. There is no rabbet on either the stem or sternpost. The ends of the planking are edge dowelled onto the bevelled inside edges of the stem and lower part of the sternpost, as shown in Burningham (1989: 207). In the stern the upper strake is not edge dowelled to the sternpost. Also the plank that extends the strake to the sternpost is not a sawn plank that has been bent into shape, rather it is carved to shape from a block of timber (Fig. 46). In this respect, and in that the sternpost curves gradually into the keel, the construction of the stern of the *konteng* has affinities with the boat building tradition of Eastern Indonesia, a tradition that is significantly different from that of Java.

Midsection. There is some variation in the midsection form of *konteng* but, in general, the *konteng* with its considerable beam has a more powerful midsection than most *mayang*. The measured midsection shown in Figure 47 has three named planks in the bottom before the first distinct chine. In fact, the names *jang'ru* and *jang'lu* simply mean plank two and plank three. Formerly *konteng* were built with only two planks in the bottom; this is the case with the vessel *Terima Kasih* which is illustrated in Burningham (1989) and is now on display at the Museum and Art Gallery of the Northern Territory, Darwin. Where only two planks are used to form the bottom, the plank naming system shown in Figure 47 would obviously be inappropriate since the bilge plank is named plank four. It seems that the boat builders of Brondong-Blimbing do not have a strict traditional plank naming system.



Fig. 46. The stern of a *konteng* undergoing repair. The specially shaped planks which finish the sheer strake and the not yet shaped *golak gemi* on the starboard quarter have been fitted.



Fig. 47. Midsection of a *konteng* with the strake names.

Above the heavy rail timber (*golak*) there is a distinct wash strake, slightly set in from the rail. This is another feature that is common to various types of *perahu* from Madura and off-lying islands to the east.

Planking. Although the strakes in the midsection are enumerated rather than described by special terms, the planks which continue the strakes forward and aft of the *serangan* scarfs are distinguished as *serang* (Fig. 48). In the bow,

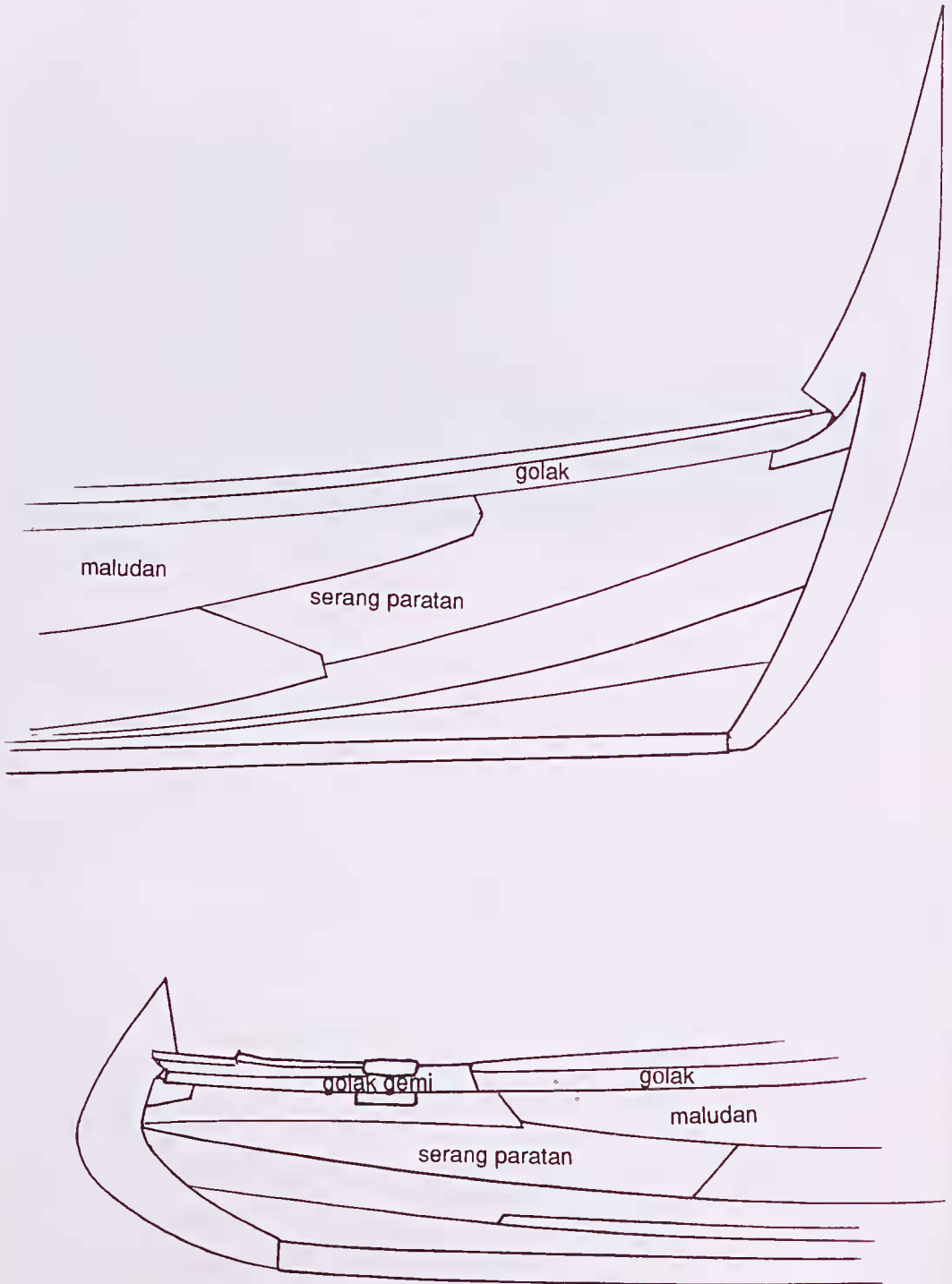


Fig. 48. Plank patterns of the bow and stem of a *konteng* with plank names.

the lower strakes are scarcely tapered so their *serang* extensions sweep high up the stem. The *serang* of the bilge strake runs so high that it reaches the under side of the rail about 1.5 m from the stem: it is called the *serang paratan* and corresponds to the *serang kembang* of the *kolek*. The topside strake does not reach the stem and has no *serang*. However, right in the bow, the topside strake reappears in the form of two carved pieces (port and starboard) that sweep upward as they converge immediately abaft the stem. This is rather like the bow finial of the *jegongan* or the second finial, abaft the stem in the Jepara *sopek*, but in this case it is not formed by the convergence of the rail timbers. The rail timbers do not meet in the bow or the stern.

In the stern the plank pattern is slightly different. The lower strakes are tapered because the design has considerably less freeboard aft. The bilge strake is very tapered, in some cases it is tapered almost to a point where it reaches the sternpost. The topside strake, which is nearly always composed of two planks one above the other, is extended into the stern and the aftermost part of the strake is often composed of blocks of timber carved to shape rather than sawn or shaped planks.

Bulkheads. A full size *konteng* is fitted with thirteen bulkheads. The bulkheads in the ends of the vessel are constructed as sawn frames and filled with light planking. Some of the bulkheads in the midbody are constructed in the same way but others are built up of horizontally layered timbers. All the bulkheads are topped by thwarts except the two aftermost bulkheads, one of which is topped by the rudder mounting beams. Relatively light top pieces, or top futtocks, which project above the thwarts, are scarfed into the bulkheads. These top pieces do not support the rail timbers. The mast steps through a large thwart immediately abaft a substantial bulkhead. The heel of the mast sits in a transverse mast step (*cupu*) which is a large floor timber, also positioned immediately abaft the bulkhead and fastened to the bulkhead.

Rudder support system. The rudder support structure is similar to that of the *kolek* (Fig. 49). The rail (*golak*) starts to widen and project outboard just forward of the *daporan* rudder mounting thwarts. The widened part of the rail is extended aft by large, shaped timbers, and is distinguished from the rest of the rail, or *golak*, as the *golak gemi*, or *golak kemi*. The *golak gemi* is approximately the same depth as the rest of

the *golak* but it is about 200mm wide and projects considerably from the planking on each side of the stern. Another timber is edge dowelled onto the outboard edge of the *golak gemi* and the rudder rotates in a notch cut in the outboard edge of this timber. The upper *daporan* thwart is notched into the *golak gemi* and the lower thwart helps to support the projecting *golak gemi*. The name *gemi*, or *orkemi*, can be used to mean the stern of a vessel and it also means "splice" or "join together".

IJON IJON

The *ijon ijon*, sometimes called just *ijon*, or *jong*, is a sister vessel to the *konteng*. Like the *konteng*, *ijon ijon* are built in the twinned villages of Brondong and Blimbing, in *Kabupaten Lamongan*, East Java. The two types, not surprisingly, share a number of construction features but have significant differences. In broad terms, it may be said that the *konteng* is closely related to the *kolek* while the *ijon ijon* is closer to the Jepara *sopek*, in both structure and hull form.

Recognition. The *ijon ijon* is easily distinguished by the narrow projection of the stem and sternpost (*linggi*) above the sheer at each end (Fig. 50). The *linggi* are not as large as those of most other *mayang* types and they are relatively simple in shape with squared ends. The bow *linggi* is a little taller, and a little less raked than the one at the stern. There is a second distinctive finial immediately inboard of the *linggi* at each end. This finial is similar to the one in the bow of the Jepara *sopek* and is also found on a number of *perahu* types from the region of Madura. At Brondong-Blimbing it is called the *topengan*. The same name is used along the north coast of Madura while the name *pakes* is used on the islands east of Madura where the feature seems to have originated. As with the *konteng*, the paintwork of *ijon ijon* is often extravagantly decorative.

Size. The *ijon ijon*, like the *konteng*, is very standardised in size. It is a smaller vessel than the *konteng*. A new *ijon ijon*, measured in 1990, had dimensions of 9.9 m x 3.73 m x 1.21 m. These dimensions are slightly larger, particularly in the beam, than was typical for older examples.

Rig. The *ijon ijon* does not carry the same rig as the *konteng*. While the *konteng* carries a single quadrilateral sail, the *ijon ijon* carries two

masts and two triangular *lete* sails in a configuration similar to that found on many small Madurese craft (Fig. 51). The smaller foresail is not always carried today on vessels that have auxiliary engines. The mainyard is much lighter than that of the *konteng*: it is a single length of bamboo, sometimes reinforced by lathes of split bamboo. The mainmast is stepped in the same way as in the *konteng*.

Use. *Ijon ijon* are used extensively for fishing with *payang* nets as well as other techniques of fishing. *Ijon ijon* based in *Kabupaten Lamongan* are operated over quite a wide area and frequently sell their catch in other ports such as Jepara in Central Java. They return to their home port only after several weeks, in some cases.

Distribution. The greatest number of *ijon ijon* can be found at Brondong and Blimbing where they are built. There are also large numbers of *ijon ijon* owned at Rembang, Central Java, where they are, apparently, called *konting* (Hawkins 1982: 104-5). They are also found on the north coast of Madura, in the villages of Pasean, Ambunten and Pasong Songan. Painted in the relatively subdued Madurese style, they blend in well with the locally built boats which are similar in appearance.

Recent history. Very little is known of the origins of the *ijon ijon*. Nothing much like it is illustrated by Van Kampen (1909). It combines

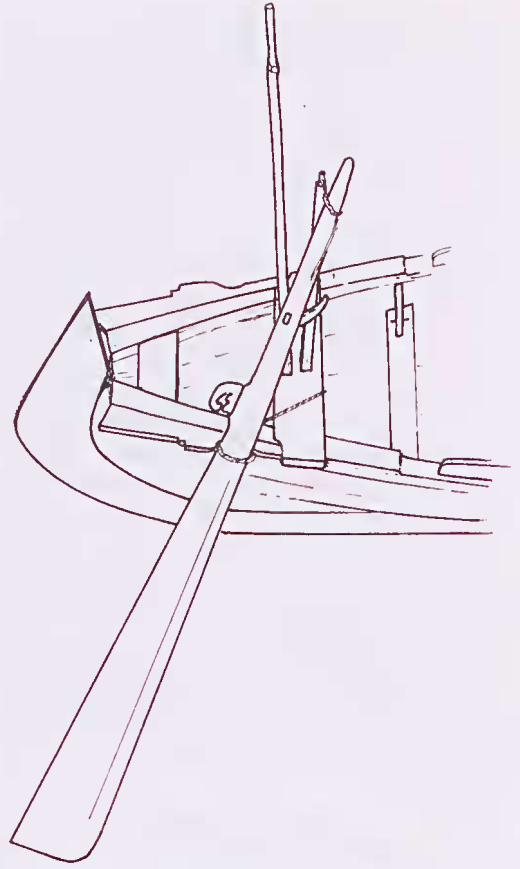


Fig. 49. Rudder support structure of a *konteng*.



Fig. 50. *Ijon ijon*.

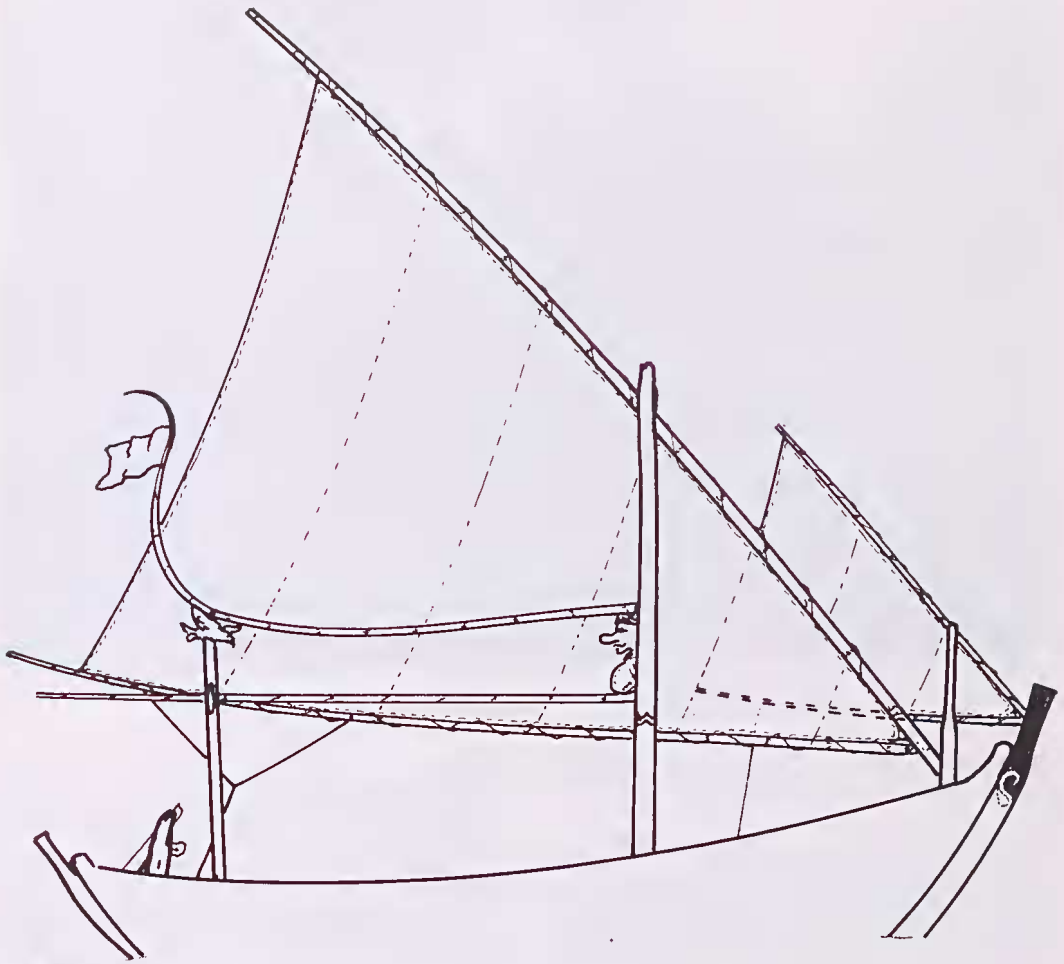


Fig. 51. The rig of an *ijon ijon*.

features of a *mayang* with design apparently derived from certain Madurese vessels, but these Madurese vessels also seem to be recently developed.

Construction. Keel, stem and sternpost. The straight keel on recently built *ijon ijon* is a fairly heavy timber. On some of the older vessels it is noticeably lighter and tends to be slightly wider than its depth. A newly laid keel, in 1990, measured 225 mm x 125 mm. The stem is more raked than that of the *konteng* or most other types of *mayang*. The sternpost is even more raked, but the finials of the stem and sternpost are fairly upright and are nearly vertical on some older boats. Both the stem and sternpost are curved. There is no rabbet on the stem or sternpost, the inner faces are bevelled to take the butt ends of the planks. A short apron timber is fitted in the bow and the stern, and secures the ends of the

upper strake and fills the finials formed by the upswept ends of the rail in the bow and stern (Fig. 52).

Midsection. The *ijon ijon* has more beam relative to its length than any other type of *mayang*. The measured midsection shown in Figure 53 has as much beam, and is almost as deep, as that of a *konteng* nearly three metres greater in length. The planks are named or enumerated in the same way as those of the *konteng* up to the *maludan*. Above this is an extra strake called *tampih* and then a narrow, constant depth rail plank called *gedok*, which is like the *golak* of the Jepara *sopek*. There is no heavy rail timber. Instead a plank is fitted horizontally, on the inside of the *gedok*, just below the line of the sheer. This horizontal timber, the *tenkam*, is about 200 mm x 45 mm, and sits on top of the frame ends. *Tenkam* is the Madurese term for a similar struc-



Fig. 52. Stem of a nearly completed *ijon ijon* showing the sternpost and the stern finial.

ture in which the timber usually slopes outwards rather than lying completely horizontal as it does on the *ijon ijon*.

Planking. The plank pattern of the lower strakes is very similar to that of the *konteng* (Fig. 54). Forward, the *serang* extensions of the lower strakes are not tapered so they run out high on

the stem. Aft, more taper is used. In the bilge and the topside planking, none of the seams run cleanly through to the stem or sternpost. The *ijon ijon* does not have strakes running from one end to the other. The planking in the ends, although connected, is discontinuous to the midbody planking. The plank patterns for the ends is,

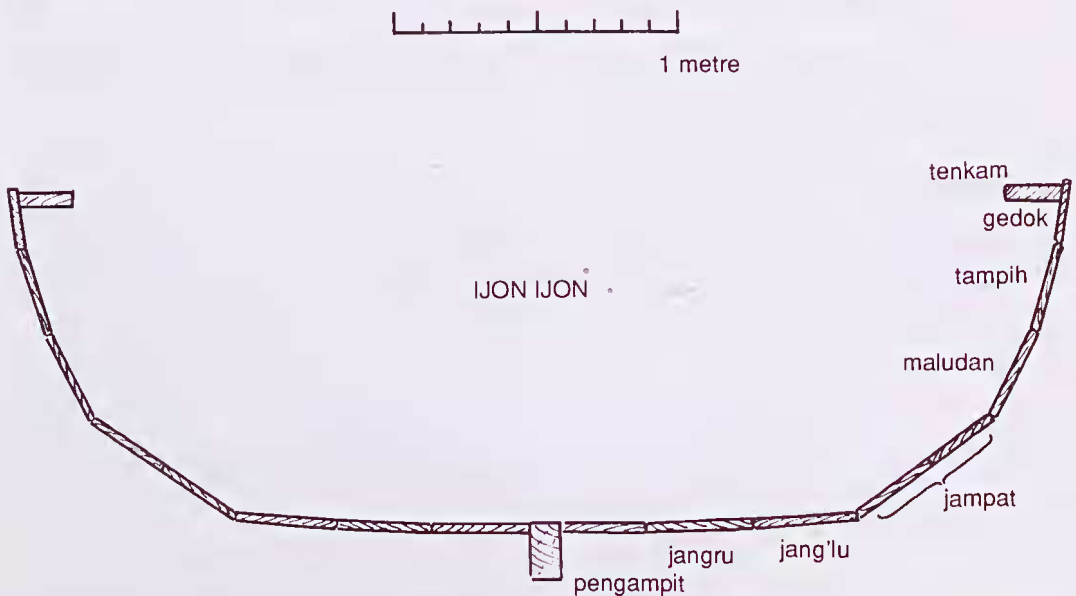


Fig. 53. Midsection of an *ijon ijon* showing the strake names.

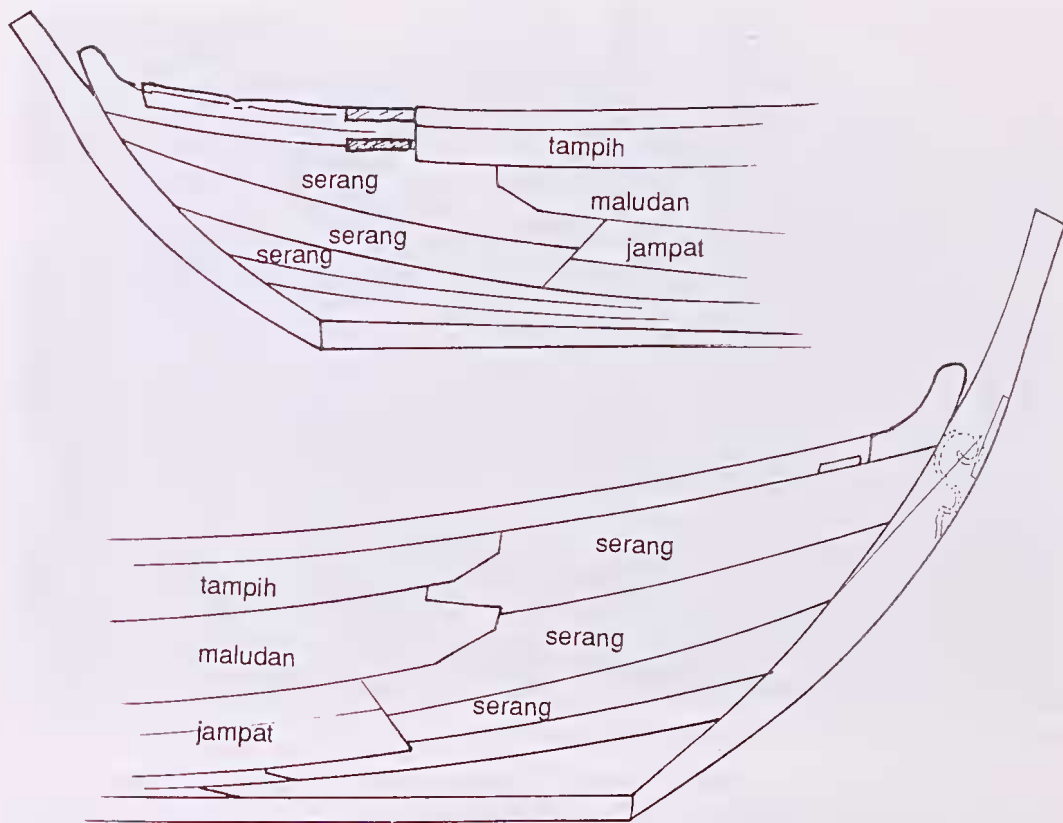


Fig. 54. Plank patterns of the bow and stern with plank names.

nevertheless, fairly standardised: a typical arrangement is illustrated in Figure 54.

Bulkheads. Ten bulkheads are fitted in a standard *ijon ijon*. The bulkheads and related structure of a nearly completed *ijon ijon* are illustrated in Figure 55. Three longitudinal timbers, one on each side, and one on the centreline, are secured in place beneath the thwarts. These add strength to the structure of the hull and also support the removable decking planks which lie flush with the thwarts. All *mayang* are fitted with a similar structure but in the *ijon ijon* it is heavier and more obviously of structural significance.

Rudder support structure. The rudder support structure is identical to that of the *konteng*.

JANGRAJA

This is a form of *mayang* from the eastern part of East Java. It is a distinctive type with numerous distinguishing features that are not found on any other *mayang*, but there are strong similarities in the plank structure to the general *kolek/konteng* design.

Recognition. Very easily distinguished by the extremely high prow structure, as shown in Figure 56. *Jangraja* are often lavishly decorated with flags, pennants, and intricate ornaments made of copper wire and beads. They also have very distinctive paintwork patterns (Fig. 57). There is nearly always a snake motif, said to have magical powers, decorating the prow structure: it is called *pe'kopek* in *bahasa* Madura or *penjampi* in Indonesian.

Size. These vessels are very standardised in size. A typical example measured 12 m x 3.13 m x 0.85 m. Unlike other types of *mayang*, there appear to be no smaller versions of this type at all. Though long and fairly beamy, they have relatively little moulded depth.

Rig. Today the *jangraja* carry a single *lete* (Indonesian lateen) sail. This type of sail has long been in use in the area, it is shown in an 1856 watercolour sketch of Madura Strait by Thomas Baines (reproduced Braddon 1986: 112). Although side mounted motors have been widely used for some years now, most *jangraja* still carry a large sail and use the sail in preference to the motor when conditions are favourable. The up-



Fig. 55. An *ijon ijon* under construction showing the internal structure.

per spar of the *jangraja* rig is more or less straight, and is made of bamboo.

Use. These vessels are used almost exclusively for fishing with large *payang* nets, which helps to account for their uniformity of size. Unlike the *konteng* of Brondong-Blimbing, the *jangraja* make only short fishing trips. They usually leave port late in the night, with the help of the land breeze, and return the following afternoon, often with a sea breeze which comes up against the

prevailing southeast trade winds during the afternoon.

Distribution. *Jangraja* are found from a little west of Probolinggo (about 80 km east of Surabaya) almost to the eastern extremity of the north coast of Java. The major concentrations are at the village of Pesisir, near Besuki, and the harbour of Panarukan, a little further to the east. Formerly a few were found along the south coast of Madura, especially at Camplong and



Fig. 56. *Jangraja*.

Bandaran, but there appeared to be none left in 1990.

Recent history. These vessels are usually called *perahu payang*, or *mayang* by the fishermen who operate them. In South Madura they are called *gelati* or *gelatik*, but this term is not used at all in the area of Besuki on the mainland. All *jangraja* are built by men from the area of Nguling, a little to the west of Probolinggo and it is the builders who employ the term *jangraja*. *Jang* means plank, and *raja* literally means king or ruler, but can mean big or important. Whether the name means big planked boat, boat with big planks, or refers to the large prow structure which is built from large planks, is not clear.

Many of the builders and operators of *jangraja* are of Madurese descent, as indeed is a large part of the population of the Javanese shore of the Madura Strait. The design of the *jangraja*, however, has more in common with the Javanese *mayang* than it does with the traditional craft of Madura.

As noted above, Thomas Baines sketched *mayang* fishing in Madura Strait in the middle of the last century. The vessels he drew carried

the triangular *lete* rig, rather than the quadrilateral sail, which is a strong indication that the vessels were locally owned. Baines was a very accurate observer of sailing vessels. The *mayang* that he drew in Madura Strait setting *payang* nets appear to be the same size as the typical large modern *mayang*. They do not have the styling of the *jangraja* but have the prow style and decoration very much like that of the *mayang* from Bantam, West Java illustrated by Van Kampen (1909: fig. 1, pl. 4). This style is more closely related to the *kolek*. The vessels that Baines drew have fairly high freeboard, whereas the *jangraja* have particularly low freeboard. In this respect Baines' vessels look more like the *mayang* of Brondong-Blimbing.

If the *jangraja* was not the *mayang* of Madura Strait when Baines was there, it certainly existed at the beginning of this century. Van Kampen (1909: pl. 5) shows a photograph of a fine *jangraja*, apparently identical to many that are in use now.

Construction. Keel and ends. The keel is straight, more or less square in section and not very substantial for the size of the vessel. The

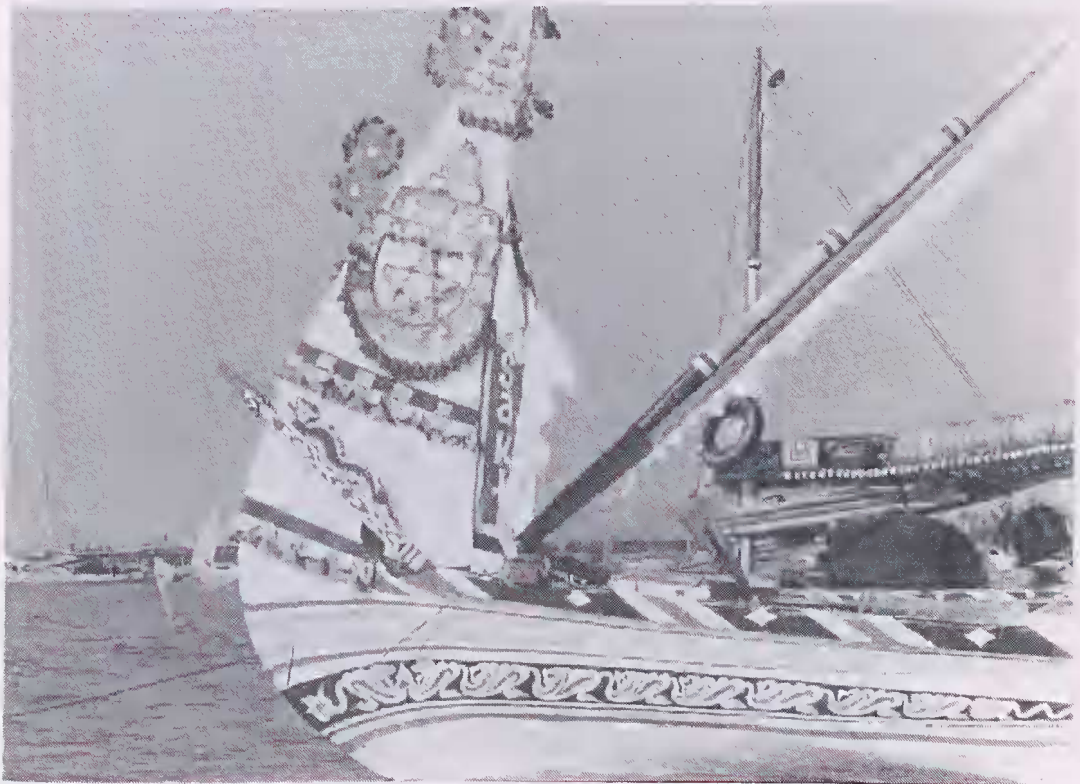


Fig. 57. The decorated *linggi* of a *jangraja*.



Fig. 58. The keel and *linggi* erected at the start of construction. The *linggi*, which symbolises a phallus has been wrapped with a white cloth, presumably for the sake of modesty. The *linggi* of *konteng* are usually wrapped when in harbour.

huge stem/prow and sternpost are constructed from large planks, about 90 mm thick, edge dowelled together. As with the *konteng*, the ends of the planks simply butt on to the stem and the sternpost - there is no rabbet. It can be seen that the lower part of the stem, in Figure 58, shows considerable curvature and rake but the inner face of the stem, where the planking abutts (the equivalent of the rabbet) is straighter and more upright, as it is in most *mayang* types.

As with the *kolek* and the *konteng*, the upper part of the stem is clear of the hull and unsupported. The stem is tied to the hull by a stout wire bridle which is passed through two holes in the stem near its outer edge just above the waterline: these wires lead diagonally up on each side of the hull to pass through the heavy rail. The two ends are joined and the bridle is set up taut by twisting it.

It is common to see the projecting prow made of planks with natural holes in the timber (Figs 56, 58). The holes are left unfilled. Probably these natural holes in the stem are thought to confer good luck, as they are by the traditional boat builders and sailors of South Sulawesi (Macknight and Mukhlis 1975: 278). There is a good deal of superstition involved in the decoration of these vessels.

Midsection. The midsection form is considerably shallower than for other types of *mayang*. The double chine is clearly defined and the bottom is gently curved (Fig. 59). There are no separate terms for the strakes of the bottom. All of the bottom planking in the midbody is collectively referred to as the *pengampit*. This is unusual because *pengampit* and cognate terms are

very widely used in Indonesia and Malaysia to mean specifically the first strake (the garboard strake) rather than the lower planking. In a large modern *jangraja* there are usually three strakes in the bottom. The bilge strake is called the *akong*, which is usually made up of two strakes in modern practice. The topside strake is the *ko'ong*. The terms *akong* and *ko'ong* apply for the full length of the strakes, right to the ends of the hull. No *serang* (or *milong* in the local terminology) are recognised for these strakes.

The rail, called the *lete*, is flush with the planking on the outside. It is a heavy timber, typically about 120 mm deep x 180 mm. Outside this there is a wale called the *telep*. No other *mayang* type is built with a wale but several Madurese types of *perahu* have one or more wale.

Planking. The early stages of construction of a *jangraja* are illustrated in Figure 60. There are three planks fitted in place either side of the keel, in the midbody of the vessel. This comprises the *pengampit* which appears an almost flat platform. Not a single plank has been added to either end at this stage. The end planks of the *pengampit* strakes are referred to by the builders of *jangraja* as *milong* or *melong*: this is the equivalent of the term *serang* used by other *mayang* builders (Fig. 61). Looking at the plank pattern of a completed hull, it will be seen that there is little taper in the planks which extend the lower strakes into the bow and stern, and therefore they run up high on the stem and sternpost. As a result, the bilge strake (*akong*) reaches the sheer in the bow and the stern, while the the topside strake tapers out under the rail

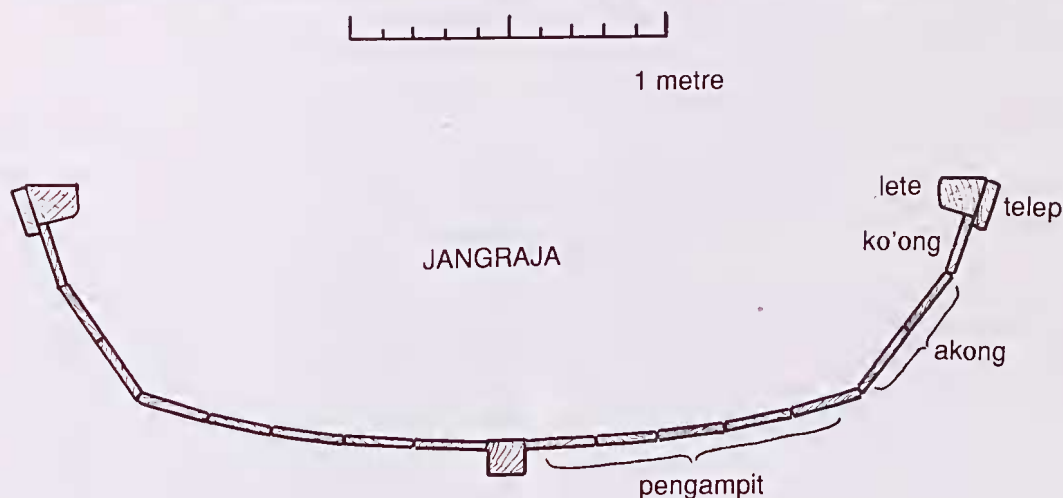


Fig. 59. The midsection of a *jangraja* with the strake names.



Fig. 60. The early stages of construction when only the midbody planking is assembled.

before it reaches the ends. This is similar to the planking pattern of the *kolek* and several other *mayang*.

The hull is finished with the fitting of the wale (*relep*) around the outside of the rail. The function of the wale seems to be more aesthetic than structural. It is a feature of several types of Madurese *perahu* and other smaller vessels built in the same area as the *jangraja*. The wale is usually painted with diagonal stripes, as in Figure 56. The whole vessel is usually painted with complicated geometric patterns which distract the eye from the run of the seams in the planking. The planks are carefully and closely fitted together, so the seams and plank structure of the painted vessels are very difficult to discern.

The *jangraja* has particularly low freeboard, and a very flat sheer by comparison with other *mayang*. If the *jangraja* is compared with most of the Madurese designs that are found in the same area it appears even more flat sheered. Perhaps the builders, who were familiar with the Madurese tradition, exaggerated the relatively low freeboard and flat sheer of the *mayang* when adopting the design and structure of that type. The low freeboard is convenient for handling the nets, and for rowing if no engine is used, which was the case until recently. *Jangraja* operate in

the fairly sheltered waters of Madura Strait and make relatively short voyages so they do not need the seakeeping qualities of the *konteng* or *jegongan*. Madura Strait is, however, more than thirty nautical miles wide and can become quite rough.

Bulkheads and frames. A *jangraja* normally has eleven bulkheads plus a floor timber which serves as the step for the spar crutch and rudder support post in the stern. The bulkhead structure is similar to that found in the *konteng* but it is usually less neatly executed.

Rudder support system. This is a version of the normal *mayang* system with a single rudder support post rather than the bifid rudder support post, or twin posts, found on most Madurese vessels. Along with the spar crutch, the rudder support post is stepped through a wide thwart (*panggalan* or *bangkalan* in *bahasa* Madura) with its heel fitted into a notch in a floor timber below the thwart. The rudder support thwart differs from that of other *mayang* in that it lies completely below the rail rather than being notched flush into it, and extends outboard only very slightly. The projecting ends are not clearly discernible. Aft of the rudder support thwart, the rail is extended by a heavier timber, rather like that in the *kolek* and the *konteng*.

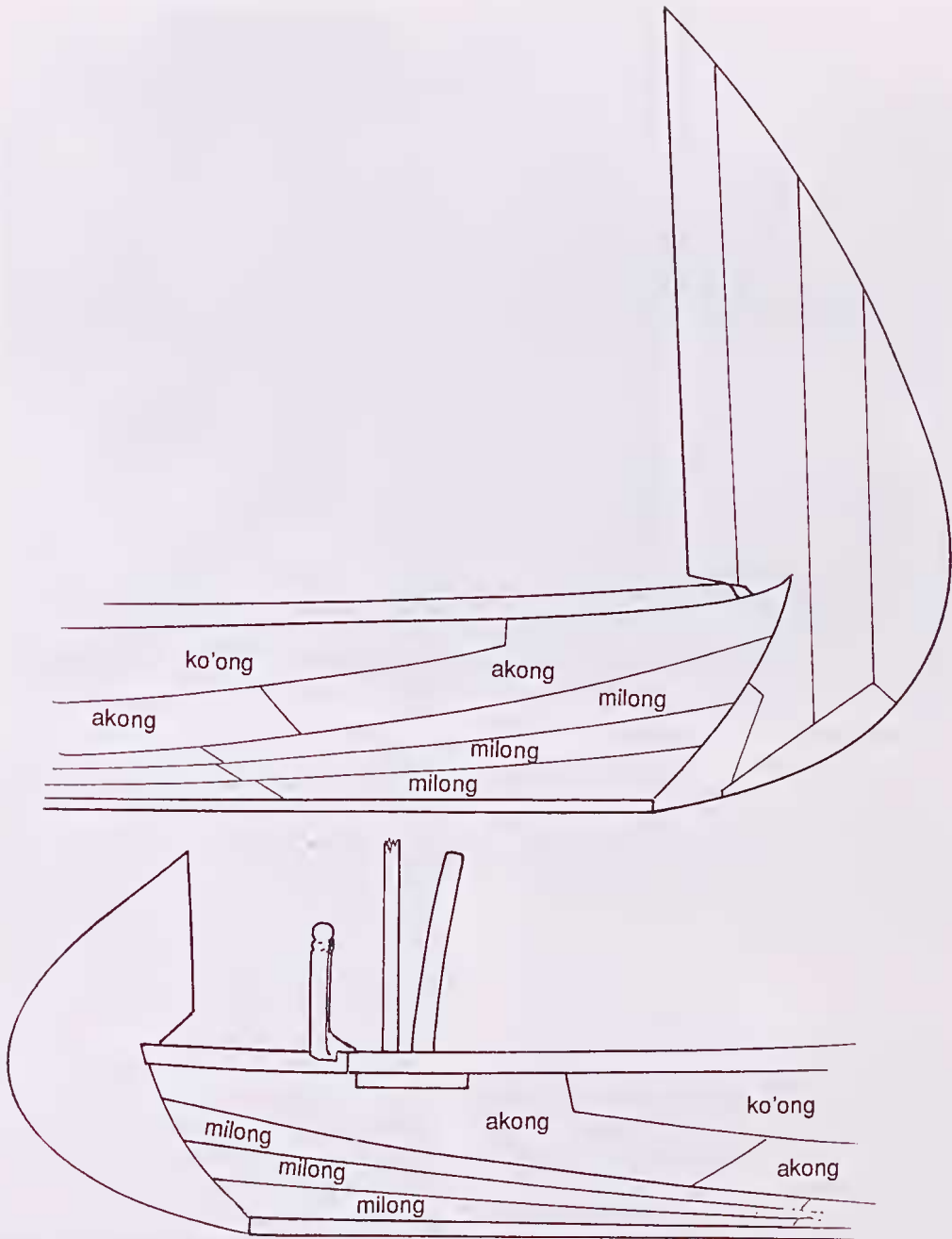


Fig. 61. Plank patterns of the bow and stern of a *jangraja* with the plank names.

The means of securing the rudder in place is somewhat different from that of other *mayang*. The rudder is lashed against a projecting, crooked timber called the *sengkir* (Figs 61, 62). The *sengkir* itself is firmly secured by lashings and is not normally unshipped in port.

Only one *sengkir* is fitted, on the starboard side. There are reasons to suppose that in the past,

before engines were used, a *sengkir* would have been fitted on both sides since the rudder has to be carried on the port (lee) side when the vessel is under sail on starboard tack. Larger trading vessels from the same area, called *perahu kacik*, carried port and starboard *sengkir*. However, local informants were quite adamant that *jangraja* never carried a port *sengkir*: the nets



Fig. 62. A carved *sengkir*.

are shot from the port side and they would have fouled on a projecting *sengkir*. In order to sail with the rudder on the port quarter a temporary arrangement was rigged, presumably something like the *mangga mangga* of the *kolek*.

EDER

Eder are small fishing vessels built only on the mid-south coast of Madura. In style they are related to the larger *jangraja* built by Madurese people across Madura Strait on the north coast of Java. *Eder* are not typical *mayang* in all respects, like the *jangraja* they have some Madurese elements in their design, but they have a distinctly chined midsection, and builders at Camplong, Madura, were quite emphatic that there are only four strakes in the structure, for which they had a complete set of names.

Recognition. The large bow *linggi* of the *eder* is distinctive and very strongly recurved (Fig. 63). The paintwork on a typical *eder* is ornate and attractive. There is a second bow finial formed at the confluence of the port and starboard rail in the bow, similar to that of the Jepara *sopek* and the *ijon ijon*, but strongly recurved in parallel with the *linggi*. The chines are clearly evi-

dent in the midsection, but they do not rise much before fairing out towards the ends of the hull, so they are less obvious at a distance. The rail, or wale, is a light timber fixed to the outside of the hull, and there is usually a half-bamboo lashed to the outside of the wale as a rubbing-strip.

Size. *Eder* are a small type of *mayang*; generally 7-9 m in length and not particularly deep or beamy. An *eder* measured at Camplong was 7.410 x 2.095 x 0.700 m.

Rig. There is a single, short mast, on which a boomed lateen, or *lete* sail is set. The heel of the upper spar is held in the bow, when the sail is set, by one of a number of short strops. These strops are spliced to fore-and-aft timbers (*jagalan*) which are either fitted to the inside of the planking in both sides of the bow, or fitted as a central fore-and-aft timber in the bow at deck level. There are a number of strops - up to five per side - at different positions in the bow. If port and starboard *jagalan* are fitted, the heel of the spar is held by a strop on the lee side, and strops must be shifted and changed when changing tack. In light winds the strop nearest the mast is used to set the sail peaked up high; as the wind strength increases, strops further forward in the bow are utilised, in order to set the sail with its peak lower and to move the spar's point of attachment to the



Fig. 63. *Eder*.

mast closer to the middle of the upper spar. The spars are generally rather light. There is a sheet on the boom and a vang to control the spar. The same rig is used on a variety of Madurese small craft which cannot be classified as *mayang*.

Use. *Eder* are too small to be equipped with a large, modern, *payang* net. In the area where *eder* are based, *payang* nets are carried by the larger *jangraja* which are usually called *jabar* on the south coast of Madura. Some *eder* are equipped with smaller seine nets that can be called *krakad*. Others use fine mesh nets to catch prawns and small fish attracted by kerosene pressure lanterns. They do not fish far offshore, nor do they remain at sea for long. When conditions are right, they sail in the late afternoon, fish through the night and return during the first half of the morning. In 1994 the majority of *eder* were fitted with a small long-shaft motors, but they retain a full-size sailing rig, and use the sail whenever there is wind.

Distribution. *Eder* are only found in any number in a small and distinctly limited area in the *Kabupaten* of Sampang, Madura. They are numerous at Camplong and at Tanjung Mendereng, Tambakan, a few kilometres to the east, but they are hardly found to the west of Camplong, and to the east they are not seen much beyond the border of the neighbouring *Kabupaten* Pamekasan. A few *eder* can be found on the Java side of Madura Strait, and it may be that at certain times of the year, the fleet from the Camplong area operate further afield, as fishing fleets from the north coast of Madura do.

Recent History. Vessels that can be classified as *mayang* are not found on the north coast of Madura and have very limited distribution on

the south coast, which suggests that the *eder*, and other types of *mayang*, are relatively recently introduced or adopted in Madura. To the east of the Camplong area, similar sized fishing vessels are round-bilged *perahu* of the *lete* type (eg. Burningham 1989: fig 29), or an older type built without frames or bulkheads, the *sakangan*, which has not yet been recorded in the literature. To the west there are small craft of another *lete* type with some *mayang* affinities (eg. Burningham 1989: fig 7), and a very different type, built without frames or bulkheads, the *lis alis* (Horridge 1981:32-34, plate 10). The construction of the *eder* combines some features of these Madurese types with a *mayang* midsection. A builder of *eder* interviewed at Tanjung Mendereng in April 1994 was constructing a round-bilged *lete* or *pakesan* and he stated that it was a stronger or more durable type (*lebih tahan*) than the *eder*. *Eder* tend to be less heavily constructed and perhaps they are preferred at Camplong because they can be efficiently propelled by their rather light rig, but if the trend to motorisation and the use of larger motors continues, the *eder* are likely to be replaced by *lete*.

Construction. *Keel, stem and sternpost.* The keel is usually shallow and wide, almost a median plank. It is usually straight throughout its length, but at the ends it is extended by up curving pieces called *dapang* or *dapangan*. This is a Madurese characteristic. Above the *dapangan*, the large bowlinggi is built up from timbers edge-dowelled together with little regular pattern, but in general the same type of construction as the *linggi* of a *jangraja* is employed. The stem rabbet rakes sharply forward in its lower part following the curve of the *dapangan*. It curves

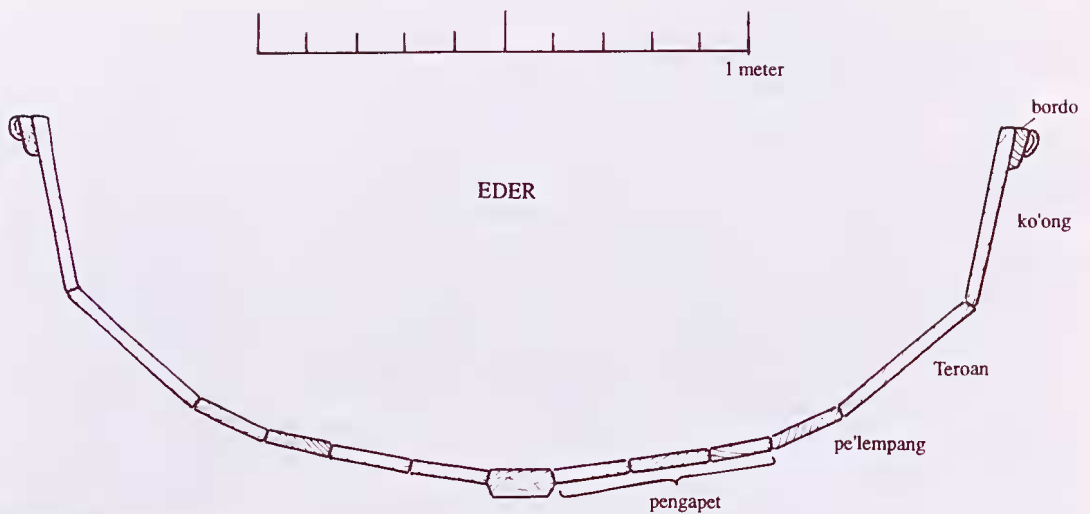


Fig. 64. Midsection of an *eder*.

sharply and then recurves aft in its upper part. In the stern the rabbet rises a little more quickly and turns through less of a curve to finish more or less vertical. All other types of *mayang* (except the stemless *jegongan*) have their sternpost more raked than the stem. The stern *dapangan*, and *linggi* is in some cases a grown piece of timber, as in the *konteng*, rather than a number of pieces edge-dowelled together.

Midsection. The garboard (*pengapet*) and second nominal strake (*pe'lempang*) form a gently rounded bottom with little deadrise and with the *pe'lempang* rising quite perceptibly (Fig. 64). The bilge strake is wide and gives a typically *mayang* midsection. The topside strake is moderately deep, particularly when compared to that of the *jangraja*. The naming of the upper strakes - *terkoan* and *ko'ong* - is similar to that employed by builders of *jangraja*.

Planking. The plank pattern (Fig. 65) is essentially like that of *lete* and other Madurese types. The garboards are either full length planks or they are scarfed near midships. All strakes can run the full length of the hull and none of them need have a scarf near the bow or stern. The concept of bow and stern extensions to midship planking is known in some places on the south coast of Madura and the term *pemalong* is used for these planks, but *eder* are not considered to have distinct *pemalong* planks in their structure.

Bulkheads and frames. A mixture of bulkheads and frames are fitted; most bulkheads are built up from floors or full frames rather than horizontally aligned planks edge-dowelled together. In the ends of the hull there are often solid bulk-

heads sawn from large single planks vertically aligned. The bulkhead built on the floor that is the mast step, is built up higher than the level of the decking and the other bulkheads. The thwart that sits on top of it, and through which the mast steps, is let through the hull planking and projects very slightly. There is another projecting thwart at the same height towards the stern. Some Madurese vessels are built without frames or bulkheads and derive their structural rigidity from having a large number of thwarts fitted. Because these thwarts cannot be fastened to frames (there are none), either directly or by way of a beam shelf, they are let through the planking and fastened to it by the internal edge-dowelling that also fastens the planking together. The two projecting thwarts of an *eder* obviously reflect this tradition of construction.

Rudder Support System. The rudder is lashed against the aft face of a large projecting thwart which sits right in the stern. This thwart, along with the heavier beam which is immediately forward of it, is not called the *dapuran* as the corresponding and similar structure is on most Javanese and Madurese vessels, instead it is called the *bangkalan*. *Bangkalan* is also the name of the western district of Madura. The rudder mounting post which steps through the heavy beam which is the forward component of the *bangkalan* is called the *tajuk*, a name which can mean 'horn', and is usually applied, in a nautical context, to the top timbers in the framing of a *perahu*. There are sometimes short fairings on the rail aft of the *bangkalan* which the rudder bears against, like the *serang manis* of a

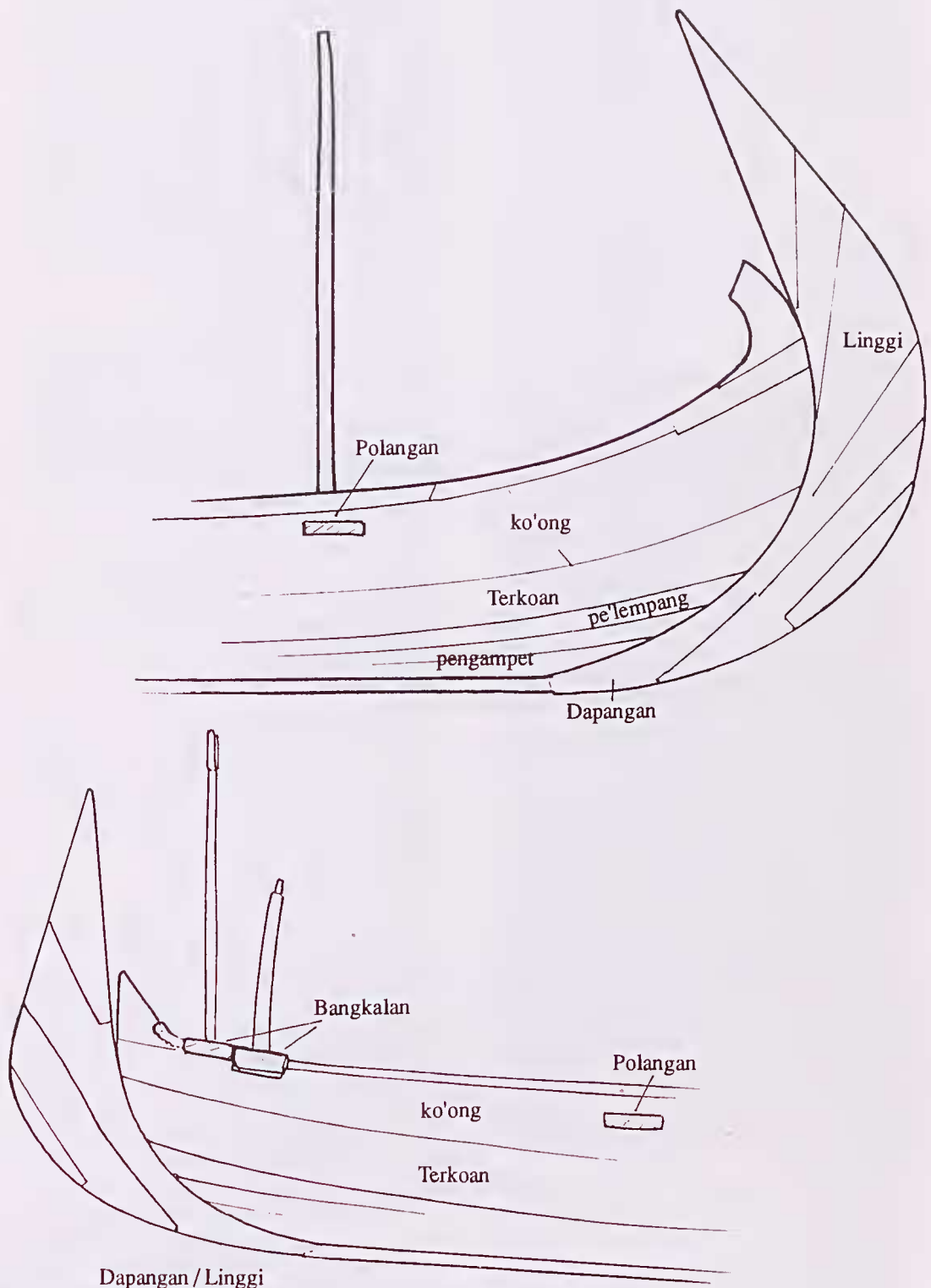


Fig. 65. Bow and stern profiles of an eder.

compreng; they are called *pekepe*. The terminology collected from builders at Camplong and Tanjung Mendereng was significantly different from the terminologies used by builders of different types of *perahu* in neighbouring parts of Madura, but had very few cognates with any Javanese *mayang* builder's terminology.

PLANK NAMING SYSTEMS

The various plank nomenclatures used by *mayang* builders in different parts of Java provide information about the builders' conception of the construction and also clues as to the development and relationship of the various types of *mayang*.

The evidence of the plank naming systems suggests that the builders regard the plank shell of the hull, not as a series of strakes running from one end of the hull to the other, but as consisting of the midbody planking and the structurally distinct bow and stern planks, called *serang*. The word *serang* means "attack" in Indonesian while *berserang* means "to increase". As a boat building term referring to the bow and stern, it appears to derive from the idea of the bow and stern being "additions" or "extensions" to the midbody. The noun *serangan* is used to name the scarfs or butts joining (and adding) the *serang* to the long midbody planks. The term *serang* is used by traditional boat builders on the east coast of Malaysia to name the apron timbers that are fitted between the converging bow and stern planking, and also to name the whole bow and stern structures of which the aprons are part. The Javanese term can be understood in the same way; referring to the whole structure of converging planking in the bow and stern.

The concept of special bow and stern planking is by no means unique to *mayang* builders. For example, specially shaped bow and stern planks are named *tungku tungkulu* in South Sulawesi (Horridge 1979: 17). They are called *salureh* by the Bajau of Eastern Indonesia, and *tujjah* in the Sulu Sea region. At Bonerate, an important boat building centre where the Bhinongko dialect of Butonese is spoken, these planks are called *sarempa*.

The various names for the *mayang* midbody strakes, which are given in the text above, are tabulated in Figure 66. Some of the sets of terms are simple enumeration and have been disregarded for this reason. Some others should probably be disregarded since they are descriptive

names (most likely, these were supplied as polite response to silly questions asked by one or other of the authors). Two systems are listed for the *compreng*: the first is the one described in the text, and the second is one displayed in the Museum Bahari, Jakarta. There are also two systems listed for the *jegongan*: the first is a system collected at Eretan in 1989 and noted in Burningham (1989: 200), the second is described in the text. The plank naming system employed by the Madurese speaking builders of the *jangraja* is clearly differentiated. No system is listed for the West Java *sopek* because it is the system used by builders of the *compreng* and is listed for the *compreng*.

It can be seen that some terms are fixed or common, some are variable, and some can be regarded as anomalous. The two ends of the various systems are fixed: the first strake is always the *pengampit* or *pengapet*, (the exception, *dasar*, means "base" in Indonesian, and may be regarded as simply a description). The term *golak* is always used to name the rail.

Karon is also fixed as both a second named strake and part of the bottom planking.

Menteng/cementeng is the fourth named strake and part of the topsides in both the *jegongan* systems. It does not appear elsewhere in *mayang* building but it is used by some Madurese boat builders and means belly or paunch.

Cantel is a fourth named strake and is the bilge strake. However the bilge strake is the third strake in most other systems. The term is only used by builders of *compreng* but is consistently applied by a large number of *compreng* builders.

Sender is a third strake and the turn of the bilge, but it only appears once.

Everything else is variable or anomalous.

Maludan is always in the topsides but it can be the fourth or fifth named strake.

Telon is an interesting variable. It is always a third named strake, and ought to be, since the name means third. But it shifts from the turn of the bilge to the bottom planking and occupies an indeterminate position in the rather different section of the Jepara *sopek*.

Gedok is always in the topsides but shifts from the fifth topside/sheer strake to the rail and then up to the wash strake.

The strake naming systems of the *kolek* and the *jegongan* can be regarded as "classical" four strake systems. There are three systems with five named strakes listed. Two of them are for the *compreng* and one for the Jepara *sopek*. In the

case of the Jepara *sopek* the system is partly simple enumeration - *telon*, *k'ampat* means third, fourth - and the midsection is, in any case, atypical. Smaller Jepara *sopek*, in fact, often have a four strake structure, so a five strake naming system could not be applied to them (the same is true of the *ijon ijon* and *konteng* terminologies which are largely enumeration). The two *compreng* strake naming systems appear to be adaptations of a four strake system. The fifth strake is named *gedok* or *golak*, names that are elsewhere used for the rail and for a washstrake, pieces that are not part of the plank shell proper.

DISCUSSION

The *mayang* is clearly a type of vessel of some antiquity. Vessels that are recognisable as *mayang* were drawn by western travellers in Southeast Asia as early as the 16th century: the earliest example is a 1598 engraving in *D'Eerst Boeck* (reproduced in Manguin 1980: 217).

There are several sketches by Sidney Parkinson who accompanied Cook on HMS *Endeavour* (reproduced in Joppin and Smith 1985: 232) which show *mayang* in more detail.

These early representations (and a greater number of 19th century representations) are recognisable as *mayang*, primarily on the basis of the recurved bow and stern profile (Fig. 67). This type of recurved profile is still the most obvious distinguishing feature of the bow and stern of *kolek* and *jangraja*, the bow of the *compreng* and the stern of the *konteng*. Other details such as the single masted, tilted rectangular sail rig, the spar crutch in the stern, the *andang* and the single quarter rudder reinforce the identification of these early representations as *mayang*, but it is the recurved profile that is crucial. It is a style that is virtually unique to the Javanese *mayang*. The only other examples in Southeast Asia are found in neighbouring areas of Sumatra.

The non-Chinese, traditional planked craft of the South China Sea region (Malaysia, Borneo, Thailand and Vietnam) are broadly similar to the

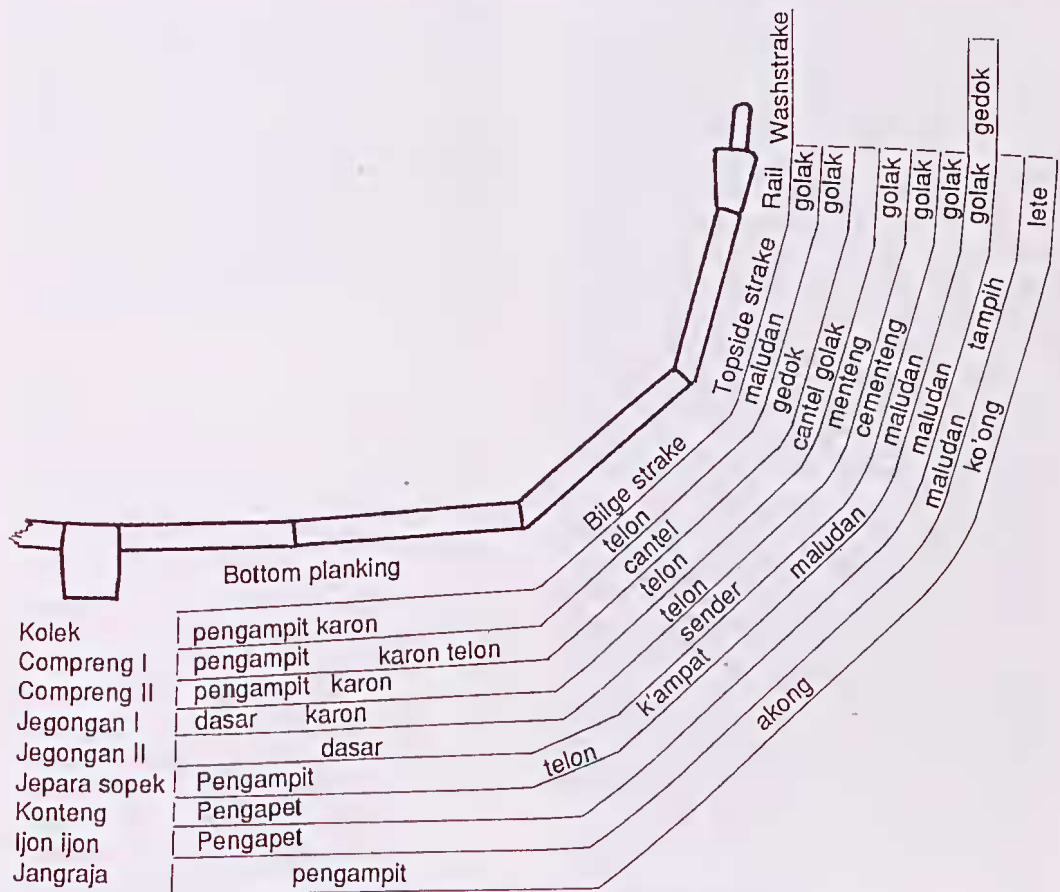


Fig. 66. Various strake naming systems tabulated and arranged for comparison and analysis.

mayang. They are built using heat to bend planks and they have moderately sharp, double-ended hulls, often with some hollow in the forefoot and heel. None of them share the recurved ends of the *mayang*. The Malay *payang* has a number of details in common with the *mayang* and its intended function is the same, as the name implies. Its bow and stern profile are stylistically typical of east coast Malay vessels but quite unlike those of the *mayang* (Fig. 68a). The *rua chalom* from Thailand (Fig. 68b) is of a different and widely spread style, and it is also quite unlike the *mayang*, with the exception of the anomalous *jegongan*.

While the early representations of *mayang* are distinguished from other regional craft by the recurved stem, a purely stylistic element of the *mayang* design, there are a number of structural features and elements of the hull form of the modern *mayang*, that, taken together, distinguish the *mayang* from all other craft.

These features can be summarised:

1. A long straight keel which meets the stem and the sternpost at a distinct angle;
2. Bulkheads as part of the framing;
3. A chined hull form with an almost flat bottom and double chines in the midsection;
4. A plank pattern in which long planks are fitted in the midbody so that no joins in the planking occur near midships. The planks and the strakes are as wide as possible with a total of only four strakes being the standard structure. The lower two strakes comprise the base (*dasar*) or bottom of the hull. The other two strakes form the turn of the bilge and the topsides. It is this structure which produces the double chined midsection. The planks at the ends of the lower strakes are not (much) tapered, particularly in the bow, so the upper strakes have to be tapered out before they reach the stem and, in some cases, the sternpost.

Some traditional planked boats of the South China Sea region have a straight keel which meets the stem and sternpost at a distinct angle, but most traditional craft of the region, including the *payang*, have some rocker (convex curvature) to the keel. Traditional vessels of Thailand and Vietnam do not have a projecting keel, rather they have a stout median plank which often retains the form of an opened out dugout canoe. It usually has some rocker.

The use of bulkheads is standard in the boat building tradition of China, but the *mayang* builders' use of bulkheads rather than frames seems to be a unique example of this construc-

tion outside the Chinese tradition. The use of the bulkheads in *mayang* is somewhat different from the normal use in Chinese boat building. In the *mayang* the bulkheads are fitted into the completed plank shell whereas in Chinese boat building the bulkheads are erected as formers on top of the bottom planking before the rest of the planking is fitted. This comparison is only true in respect of what can be considered the north Chinese tradition. Recent discoveries of wrecks and related research by maritime archaeology in Southeast Asia indicate that there was, in the past, a south Chinese tradition of building sharp bottomed ships, by shell construction with bulkheads inserted into the shell (Green 1983). There were also non-Chinese Southeast Asian vessels of related design and vessels that appear to have been "hybrids" incorporating features regarded as Chinese and others regarded as Southeast Asian (Manguin 1980). Green (1990) has summarised the evidence from the various significant wreck-sites of the region: it is not yet clear what were the origins of the South Chinese tradition, or its relationship to non-Chinese Southeast Asian ship building; also it is not certain what were the reasons for its disappearance though the so-called "Ming ban" on the construction of ocean going vessels must have played a part. Returning to comparison with the surviving north Chinese tradition: in virtually all Chinese vessels, the bulkheads are augmented by frames - often the frames are more numerous than the bulkheads. Worcester (1971) provides plans and construction details of a great variety of Chinese tradi-



Fig. 67. The recurved bow profiles redrawn from early representations.

tional boats, nearly all of which have frames as well as bulkheads. *Mayang* sometimes have frames in the very bow and stern but never have frames between the bulkheads. Needham (1971: 397) says of the frames between the bulkheads in Chinese vessels: "it is doubtful if these are of ancient origin". Unfortunately, Worcester, whose opinion would be of great authority, offers no conjecture on this matter. Another point of comparison is that the bulkheads of the "classical" northern Chinese tradition are made watertight to divide the hull into a number of watertight compartments, whereas the bulkheads of the *mayang* are pierced by limber holes to allow bilge water to drain along the length of the hull. At least two of the wrecks discovered in the Gulf of Thailand that were shell constructed with a sharp bottom and bulkheads also had a limber channel cut into the top of the keel, presumably so that water could drain along the keel (Green 1990: 350,354). In summary, the bulkheads of the *mayang* appear to be derived from an otherwise extinct tradition of Southeast Asian ship building, related to a tradition which developed and later disappeared in southern China, but the *mayang* builder's use of bulkheads is less directly related to the "classical" northern Chinese tradition.

The plank pattern of the *mayang* is significantly different from that of traditional South

China Sea planked boats although the practice of using heat to bend planks, often in matched opposing pairs, is a common feature. In Malay and Thai boats, as characterised by the *payang* and the *rua chalom*, the strakes run smoothly into the ends of the hull. The sheer strake is always carried right to the stem and sternpost. If stealers (strakes which do not run the full length of the hull) are used in Malay or Thai boats, they are used in the turn of the bilge, as they are in the *jegongan*. This is a more common type of plank pattern and is found, for example, in Mediterranean and Arab boat building traditions.

The use of four distinct and broad strakes, producing a chined hull form is apparently unique to the *mayang*, at least in Southeast Asia. But while the chined section of the *mayang* is unique, there are other examples of strake naming systems which name four strakes. At Kuala Terengganu, Malaysia, the planks are named *lepong apit*, *papan timbal*, *perut ikan* and *biji kaya*, and above these there can be a rail plank called *papan tarik* and a washstrake called *lepa* (*lepa*, *lepong* and *papan* all mean plank). If there are more than four strakes, the extra strakes are all called *papan timbal*. The Bajau of Semporna, Sabah, name four strakes, including a washstrake, in the construction of a *lipa lipa* canoe. The names are *pangahapit*, *gipis*, *kapi kapi* and *koyang koyang*.

Turning from the structural distinction of the *mayang*, the ornamentation of the various *mayang* is also distinctive. Most have bright and complicated designs in their paintwork. No other Indonesian traditional craft have such paintwork but the *kolek* of Kelantan Malaysia and neighbouring southern Thailand have similarly extravagant painted decoration.

The massive ornamental prow piece (*linggi*) of most *mayang* is another distinctive feature. The *kolek* with the recurved profile of the *linggi* seems to be an "original" form of *mayang* which has changed very little since examples were photographed at the beginning of this century. Several other *mayang* types show influence from other traditions of boat building, particularly Malaysian tradition and that of the various Sea Nomad people. The *konteng* is very similar to the *kolek* in structure but it has a high, pointed prow (*linggi*) which is probably a recent addition. The tall pointed prow pieces of several *mayang* types are probably all recently developed and even the *kolek* has a taller and more pointed *linggi* than formerly.

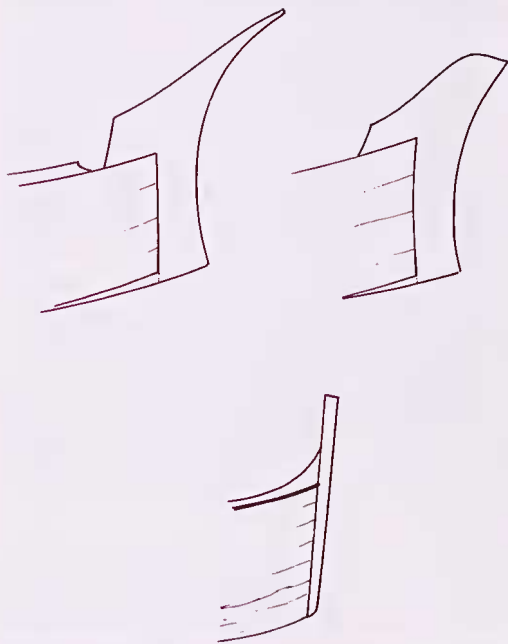


Fig. 68. Bow profiles of the Malay *payang* (upper) and the Thai *rua chalom* (below).

Burningham (1989: 217) speculated that the archaic *mayang* might have been built without a true stem or sternpost, and that, in this and certain other related aspects of their structure, they were related to other archaic traditional designs of the Indian Ocean region. This possibility is not discounted, but the stemless structure of the *jegongan* appears to be a recently incorporated design from another boatbuilding tradition. The same is true of the non-structural sternpost of the *compreng*.

If the *mayang* design has long incorporated a stem and sternpost, it is more likely that the stem without a rabbet, as on the *konteng*, is the original design, rather than the rabbetted stem of the modern *kolek*. Traditional Malaysian craft are built with no rabbet on the stem, indeed some designs are planked up before the external stem is added.

Some features of the various *mayang* types represent recent influence on the original design from boat builders of other traditions, especially boat builders of Malaysian origin. In a broader sense, the *mayang* belongs to a boatbuilding tradition that also encompasses the boatbuilding of peninsular Malaysia, Borneo, Thailand and some parts of Vietnam. Within this broader tradition the *mayang* is a very distinct type. Further detailed study of the structure and construction of traditional boats from other parts of the region is necessary to determine what are the widespread and characteristic features of the region's boatbuilding tradition. This course of research is needed to reconstruct the probable development and design of the archaic watercraft of the region which will be an important key for interpreting wrecks discovered by the burgeoning maritime archaeology of the region.

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